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ILIOPSOAS IMPINGEMENT AFTER TOTAL HIP REPLACEMENT - A YOUNG PERSON´S COMPLICATION?
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Introduction: Iliopsoas impingement is a well-recognised complication following total hip replacement (THR) caused by irritation of the tendon anywhere along its course, although typically on the acetabular component. The incidence of this is 4.3% based on two small case series. We aim to perform the largest case series to date to calculate the incidence of iliopsoas impingement and evaluate the response to steroid injection.

Methods: A retrospective case note review of all patients diagnosed with iliopsoas impingement after THR over a five year period was performed and compared to findings from the Scottish Arthroplasty Project.

Results: Over a five year period, 1000 THRs were performed at our unit, during which time 24 patients were diagnosed with iliopsoas impingement, giving an incidence of 2.4%. Whilst the average age for receiving a THR was 65, the average age for developing impingement was 54. Time to onset of symptoms was variable, however the majority occurred before one year (median 227 days). Ultrasound guided steroid injection was performed in all cases, resulting in complete resolution in 61% and no benefit in 26%.

Conclusions: This is the largest case series to calculate the incidence of iliopsoas impingement, which is lower than previously published. There is a higher incidence in younger patients, possibly due to the differing surgical indications. Arthroplasty for Perthes or DDH often results in leg length and offset being increased. This in turn will increase tension on the iliopsoas tendon resulting in a higher risk of irritation. Steroid injection is a low risk treatment that cures symptoms in many. In refractory cases, tendon release may be considered.

Disclosure: Nothing to disclose.

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THE LONG-TERM OUTCOME OF VARUS IMPLANTATION OF A CEMENTED POLISHED TRIPLE-TAPERED FEMORAL STEM: 13 TO 18 YEAR FOLLOW-UP
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Introduction: Varus alignment is a poor prognostic indicator for composite beam implants, but there have been no publications specifically studying the long-term effect on taper-slip designs.

Methods: Data was collected prospectively on 500 consecutive C-Stem hip replacements (455 patients) performed between March 2000 and December 2005.

Results: Alignment was within five degrees of neutral in 346 hips (69.2%), 107 were in varus (21.4%) and 47 valgus (9.4%). Average age was higher in the varus group (69.9 vs 68.8) and more patients were male (45% vs 34%). Average follow-up in surviving patients is 181 months (154 -225).

Varus group: Six acetabular components loosened (5.6%), four of which were revised (3.7%). There were five dislocations (4.7%) and one periprosthetic fracture. Femoral offset averaged 43mm (35-54) and no femoral components loosened.

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Neutral group: Twenty-five acetabular components loosened (7.3%), 14 were revised (4%), 12 for aseptic loosening (3.5%), one for recurrent dislocation and one for late deep infection. There were six dislocations and five periprosthetic fractures. Femoral offset averaged 44mm (35-54). Five femoral components loosened (1.4%) in association with acetabular loosening and high acetabular wear rates.

There was no difference in average subsidence at 10 years (1.45mm vs 1.44mm) and 74% in both groups subsided less than 2mm.

Survivorship to revision at 15 years was 95.1% (90.94 - 97.38%) for the neutral group and 94.3% (88.34 - 97.88%) for the varus.

Conclusions: Varus implantation occurred in older (69.9 vs 68.8yrs) and male patients (45% vs 34%). There were no differences in femoral offset or subsidence. Five femoral components (1.4%) loosened in the Neutral group but none in the Varus. Survivorship at 15 years was similar and Varus implantation was not therefore detrimental, as anticipated, but actually resulted in lower femoral loosening.

Disclosure: Nothing to disclose.

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DIRECT SUPERIOR APPROACH FOR TOTAL HIP ARTHROPLASTY - EARLY OUTCOMES IN FIRST 100 CONSECUTIVE CASES

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Background: Over the last decade there has been increased attention on optimising the early recovery following total hip arthroplasty (THA). The direct superior approach (DSA) is a modification of the postero-lateral approach (PLA), which spares the iliotibial band and minimises trauma to quadratus femoris and gluteus minimus. To date, there are no published clinical studies that have reported the early outcome of THA using DSA.

Methods: Retrospective analysis of a single surgeon's first 100 consecutive DSA THA versus 100 consecutive PLA THA over the same time period. Case notes were examined for patient demographics, length of hospital stay (LOS), physiotherapy LOS (PTLOS) and occupational therapy LOS (OTLOS), operation time, pain score (0-4), pain medication use, dichotomised satisfaction score and Oxford Hip Score (OHS).

Results: Patient demographics were similar between the two groups (61% female vs 64%, mean age 68.0 years vs 69.2 years) although the PLA group had a significantly higher BMI (27.1 vs 30.6, $p< 0.01$). The DSA group had a significantly shorter LOS, PTLOS and OTLOS. There were 23 discharges on day one in the DSA group versus eight in PLA group. Mean operation time was significantly longer in the DSA group (71 minutes DSA vs 66 minutes, $p = 0.02$). There was no clinical difference in pain scores, inpatient opiate use, satisfaction and OKS at three months. There was one periprosthetic femoral fracture in the DSA group, but no other early complications in either group.

Conclusions: In this series representing a single surgeon's learning curve, the use of DSA was safe and resulted in a shorter LOS and earlier attainment of rehabilitation goals compared to PLA, without any significant differences in complications or clinical outcomes in the early post-operative period. Further work is required to evaluate outcomes in the very early post-operative period and in the longer term.

Disclosure: The senior author receives consulting fees from Stryker.

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WHAT FORCE IS REQUIRED TO DISTRACT THE HIP TO PERFORM ARTHROSCOPY SAFELY?

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Introduction: Distraction of the hip joint is required to access the central compartment during hip arthroscopy. A previous study performed at Hip Arthroscopy Australia found in 200 patients, there was a two percent incidence of nerve injury secondary to traction. To the best of the authors' knowledge, the force required to distract the hip joint in the lateral position has not been investigated.

Aims: To measure the amount of force required to distract the hip joint sufficiently to perform hip arthroscopy.

Methods: A prototype force gauge was developed. This was applied to the distraction device for consecutive patients undergoing hip arthroscopy by the senior surgeon. Patients' age, height and weight were recorded. The force gauge recorded and plotted the amount of traction over time.

Results: Between 29th October 2014 and 2nd May 2018, 337 patients were recorded. There were 179 males and 169 females. The mean age was 33.8 years (14 - 80). Weights ranged from 43 to 129 kilograms (mean = 74.9 kg). Mean body mass index was 24.7 (16.5 - 38.7). The mean absolute force required to distract the hip was 925.2N (402 - 1868.8N). This was applied over a mean time of 32.5 minutes (8 - 77.5 minutes). The amount of force correlates with the weight ($r = 0.455$, $P < 0.001$) and BMI ($r = 0.240$, $P < 0.001$). Traction force and time also correlate ($r=0.124$, $P=0.03$). Age does not have an effect ($r = 0.018$, $P = 0.741$).

Conclusions: Hip arthroscopy performed in the lateral position as described by the senior author requires an amount of force that correlates with the patient's weight and BMI. This can be calculated by F_(max⁡(N))=9.81×1.25×M_(patient(kg)). If this amount of traction is applied with an operative traction time is less than 60 minutes as previously published, the rate of temporary nerve dysfunction can be expected to be approximately 1.5 percent.

Disclosure: Nothing to disclose.

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HIP ARTHROPLASTY SURVEILLANCE: IS IT REALLY NEEDED?

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Although long-term follow up of joint replacement is advocated, in a national audit of 42 orthopaedic units, only 43% were continuing follow up beyond five years. Four studies were conducted using mixed methods research to address the following question: Hip arthroplasty surveillance: Is it really necessary?

1. Systematic literature review: Explored evidence for clinical or cost effectiveness of long-term hip arthroplasty surveillance. One hundred and fourteen studies were included, but due to paucity of quantitative evidence related to the research question, qualitative techniques were used to examine expert opinion. Main findings: follow up was specifically recommended to monitor change (e.g. asymptomatic loosening), when outcomes of joint construct are unknown, and for specific patient subgroups.

2. Pilot observational study: Cohort of patients undergoing revision hip arthroplasty. Baseline PROMS were collected and repeated 12 months after surgery plus health resource use in the six months after surgery. Results indicate that patients with follow up report a better view of health than those without 12 months after surgery, and less health resources are used in the group with follow-up.

3. Survey of health professionals: To find out current views on long-term follow-up (172 participants). Eighty-seven percent in favour of long-term surveillance, although 33% preferred change in time intervals and methods of delivery.

4. Patient focus groups: To find out patient view. They prefer questionnaires based on everyday life (postally or electronically), an x-ray (preferably locally), would accept a letter stating results but want periodic review with orthopaedics. All wanted telephone access back-up to orthopaedic team. They stated - no exclusions - age is not determinant of health and questionnaires can act as a self-exclusion tool.

These studies suggest that some long-term follow-up is consistent with patient-centred care but needs to be delivered using effective and timely methods which can respond to evidence emerging from orthopaedic registries.

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ARTHROSCOPIC HIP SURGERY COMPARED WITH PHYSIOTHERAPY AND ACTIVITY MODIFICATION FOR THE TREATMENT OF SYMPTOMATIC FEMOROACETABULAR IMPINGEMENT: MULTICENTRE RANDOMISED CONTROLLED TRIAL

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Background: Femoroacetabular Impingement (FAI) describes abutment of the femoral neck against the acetabular rim due to morphological abnormalities of the hip. This common condition can cause hip pain and stiffness, and is a salient risk factor for osteoarthritis. The number of arthroscopic hip procedures performed to treat this condition is rapidly increasing despite limited evidence of benefit over non-operative measures. This trial compares hip arthroscopy with physiotherapy and activity modification for improving patient reported outcome measures in symptomatic FAI.

Methods: We report a two-group parallel assessor-blinded pragmatic randomised controlled study with patient recruitment from seven NHS England sites. Participants were aged 18 to 60 years with symptomatic FAI confirmed clinically and radiologically. Exclusion criteria included previous surgery, completion of a physiotherapy programme targeting FAI within the preceding 12 months, established osteoarthritis (Kellgren-Lawrence ≥2), and hip dysplasia (centre-edge angle < 20 degrees). Two hundred and twenty-two participants were randomised (1:1) to receive hip arthroscopy with excision of the abutting bone (n = 112) or goal-based physiotherapy and activity modification (n = 110). The primary outcome measure was the hip outcome score activities of daily living (HOS ADL) at eight months post randomisation. The trial was registered at ClinicalTrials.gov NCT01893034.

Results: At eight months post-randomisation, data was available for 100 patients in the arthroscopy group (89%) and 88 patients in the physiotherapy and activity modification group (80%). Mean HOS ADL was 10.0 points higher in the arthroscopy group (n = 100) compared with the physiotherapy and activity modification group (95% CI 6.4-13.6, p< 0.001), exceeding the minimally clinical important difference. No serious adverse events were reported in either group.

Discussion: Patients with symptomatic FAI referred to secondary or tertiary care achieve superior outcomes with hip arthroscopy compared with non-operative measures. The results support the provision of hip arthroscopy where there is currently significant regional variation in practice.

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TEMPORAL SUBSIDENCE RATES WITH THE C-STEM CEMENTED TRIPLE-TAPERED POLISHED STEM

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Introduction: The C-stem was designed to load the femur proximally. Subsidence within the cement mantle generates hoop stresses which transmit to the bone, reducing negative remodelling, maintaining bone stock and minimising loosening. The Exeter continues subsiding up to 10 years, but there are no long-term reports on the pattern of subsidence of the C-stem.

Methods: Data were collected prospectively on a series of 500 consecutive C-stems (455 patients) performed between March 2000 and December 2005. A posterior approach, cemented acetabulum, canal restrictors, stem centralisers and Palacos-R bone cement, containing Gentamicin, were used, with a third generation cementing technique.

Results: There were 282 female patients (62%) and age at surgery averaged 69.3 years (23-92).Two hundred and eighty replacements were followed beyond 10 years and follow-up of the remaining 189 averaged 183 months (156 - 225). Seven femoral implants loosened (1.4%), all associated with rapid acetabular wear and calcar changes at 10 years. Subsidence occurred in all but one femoral implant (99.8%) and averaged 1.53mm at 15 years. Subsidence occurred in 52% of implants between one and three years, 41% between three and five, 14% between five and 10 and 4.4% between 10 and 13, with only one implant subsiding thereafter.

Conclusions: The C-stem performed well, with low complication and revision rates. The percentage of implants subsiding decreased with the passage of time, but continued up to 13 years, at which time total subsidence averaged 1.53mm. The findings are consistent with the performance and magnitude of subsidence reported for polished double-tapered stems.

Keywords: C-stem, Subsidence, Calcar, Loosening, Wear.

Disclosure: Nothing to disclose.

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LENGTH OF STAY AND READMISSIONS AFTER TOTAL HIP ARTHROPLASTY IN PEOPLE LIVING ALONE

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Background: Enhanced recovery programs after joint arthroplasty have seen significant reductions in hospital length of stay without consequential increases in readmissions. Elderly people living alone may face challenges in taking care of their health and wellbeing after major surgery. This may predispose them to delayed discharge and higher readmission rates.

The aim of this study was to compare the length of stay and readmission in people living alone to those living with support after hip arthroplasty.

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Methods: We conducted a retrospective review of 321 patients following primary total hip arthroplasty. All patients were discharged to their own homes and followed identical enhanced recovery programs that included dedicated home support on discharge. Electronic patient records were reviewed for living support status, hospital length of stay (LOS) and readmission within 30 days of discharge. Statistical analysis for length of stay was conducted using the Mann Whitney test.

Results: Two hundred and fifty cases had documented living support information with 22% of patient's living alone on discharge. There was no difference in gender between patients living alone or with support (60% females). The mean age of patients living alone was 75 in comparison to 69 years for those living with support. The mean LOS for patients living alone was 3.6 (median 3) versus 2.8 (median 2) days in those living with support. This difference was significant (P = < 0.005). Patients living alone had a readmission rate of 12.5% compared to 5.6% in those living with support.

Conclusions: There was a significantly longer length of stay for those living alone and twice as many readmissions compared to the patients with family support.

Implications: Patients living alone after total hip arthroplasty require targeted support to ensure comparable lengths of stay and avoid readmissions.

Disclosure: Nothing to disclose.

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FACTORS AFFECTING RISK OF PERIPROSTHETIC FRACTURE REVISION OF CEMENTED POLISHED TAPER STEMS: A DESIGN LINKED REGISTRY ANALYSIS FROM THE NATIONAL JOINT REGISTRY OF ENGLAND, WALES AND THE ISLE OF MAN

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Background: Recent best practice tariff proposal encourages surgeons to use cemented stems in patients over 70 requiring total hip replacement (THR). The risk of failure secondary to periprosthetic femoral fracture (PFF) is greatest in this age group. Previous studies have highlighted stem brands which are associated with a significantly increase risk of PFF revision. In this observational study we identify key design features of polished taper stems which may change PFF revision risk in the NJR.

Methods: 210 hips, 183 patients , with a polished taper stem, proven implant combination and a diagnosis of hip osteoarthritis during primary THR were included. Effect of patient, surgical and implant features on implant survival to an endpoint of PFF was estimated with Hazard ratios (HR) and 95% confidence intervals (CI) using multivariable Cox regression models.

Results: Median follow up was 6.8 years (IQR 4.2 to 9.4). Factors associated with increased risk of PFF revision were: Age greater than 70 years (HR = 1.5, CI 1.3 to 1.8, p < 0.01), intraoperative fracture (HR = 2.963, CI 1.5 to 5.7, p < 0.01), Cobalt chrome alloy (CoCr) stem material vs stainless steel (SS) alloy stem material (HR 4.1, CI 3.5 to 4.8, p < 0.001). Factors reducing the risk of PFF revision were female gender (HR 0.46, CI 0.40 to 0.52, p < 0.01), rectangular diaphyseal cross section vs oval shape (HR = 0.56, CI 0.37 to 0.86, p < 0.01).

Conclusions: CoCr polished taper stems are at a significantly increased risk of PFF revision surgery when controlling for stem shape and key patient variables. Further work is required to identify the causative mechanism and prevent harm to patients.

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TESTING A STANDARDISED APPROACH TO VIRTUAL CLINIC FOLLOW-UP OF HIP AND KNEE ARTHROPLASTY PATIENTS IN FIVE UK ORTHOPAEDIC CENTRES

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Background: Almost 200,000 total joint arthroplasties (TJA) of the hip and knee are carried out annually in England and Wales. Fewer than five percent of TJAs are problematic. However, guidelines recommend that all patients are followed up within one year of surgery, at seven years and then every three years. This places a significant burden on orthopaedic centres.

We tested a standardised approach to virtual clinic follow-up of TJA with the aim of identifying obstacles with its implementation and finalising standardised virtual clinic documentation (consisting of a patient-reported questionnaire, radiology report and clinical decision algorithm).

Methods: Arthroplasty care practitioners in five high volume UK orthopaedic centres, with support from their orthopaedic surgeons, implemented a virtual clinic on consecutive TJA patients over ten months (excluding metal-on-metal implants). Virtual clinic users, orthopaedic patients and specialists from across the UK attended an expert discussion forum with the aim of defining the final format of the virtual clinic and to discuss the experiences of teams who implemented the virtual clinic.

Results: Data were returned on 561 TJA patients. 52% of patients were discharged using the virtual clinic, with a further 25% discharged after a follow-up phone call. The virtual clinic recalled 8% of patients for face-to-face review at the next available clinic, with the remainder placed on three- to 12- month review. Patient satisfaction with virtual clinic was 83%. Once a number of challenges with implementation were addressed, virtual clinic implementers also reported satisfaction with the clinic, with four centres continuing to use the virtual clinic. Virtual clinic users suggest that dedicated administrative support is essential, and the flexibility and cooperation of radiology departments eases professional and patient burden.

Conclusions: We achieved consensus on the standardised virtual clinic documentation. The virtual clinic provides a feasible solution to easing the burden of orthopaedic arthroplasty follow up.

Disclosure: Nothing to disclose.

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DEVELOPING A STANDARDISED APPROACH TO VIRTUAL CLINIC FOLLOW-UP OF TOTAL JOINT ARTHROPLASTY

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Background: With almost 183,000 hip and knee total joint arthroplasties (TJA) being performed in 2017 and the number of TJAs rising, outpatient services are experiencing a substantial and increasing strain. Virtual clinics are one way of reducing the demand of follow-up TJA patients. However, there is a lack of a standardised approach to assessment for virtual clinic follow up, which this study aimed to address.

Methods: Workstream 1 developed a patient questionnaire for follow-up TJA assessment using a Delphi consensus study and patient "think aloud" interviews. The on-line Delphi consensus survey consisted of three rounds with relevant stakeholders (TJA patients, surgeons, physiotherapists, radiologists and arthroplasty practitioners) to iteratively develop and refine the questionnaire until consensus on its items was achieved.

The think-aloud technique ensured that patients actually understood the questions and is a recognised method for questionnaire development. Workstreams 2 and 3 also used an on-line Delphi to develop and achieve consensus on standards of radiology reporting of X-rays for follow-up of TJR and to develop a clinical decision algorithm for guiding appropriate clinical outcomes for TJA patients. A final workstream tested the implementation of the virtual clinic in five busy UK orthopaedic centres.

Results: The patient-reported questionnaire of 13 items provides an assessment of pain, mobility and activity. The radiology report form (10 items) provides a standardised protocol for reporting of hip and knee replacement X-rays. The algorithm places patients in one of three outcome categories: discharge; review at earliest opportunity; or three- to 12- month follow up at surgeon's discretion. The implementation on 561 patients suggested that outcomes are similar to standard outpatient clinics.

Conclusions: The consensus on this standardised approach to virtual clinic follow up of TJA patients achieved by leading national orthopaedic specialists lays a foundation for national rollout that could alleviate pressure on orthopaedic outpatients.

Disclosure: Nothing to disclose.

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ARE THE RESULTS OF A CENTRE WITH "BETTER THAN EXPECTED" HIP REPLACEMENT SURVIVAL A CENTRE EFFECT OR SECONDARY TO IMPLANT DECISIONS? FINDINGS FROM THE NATIONAL JOINT REGISTRY FOR ENGLAND, WALES, NORTHERN IRELAND AND ISLE OF MAN (NJR)

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Analysis of registry data shows that few units achieve results better than 99.98% control limits. Implant selection is considered a predictor of outcome variation in joint replacement. We analysed the outcomes of a unit with statistically "better than expected" results and compared to all other units within the National Joint Registry for England, Wales, Northern Ireland and Isle of Man (NJR). We sought to determine whether improved implant survival following primary total hip replacement (THR) is a centre effect or mediated by implant selection.

We identified 664,761 THRs in the NJR. The exposure was the unit in which the THR was implanted and the outcome all-cause revision. Net failure was estimated using Kaplan-Meier and adjusted analyses used flexible parametric survival analysis.

The crude 10-year revision rate for THRs was 1.7% (95% CI: 1.3, 2.3) in the exemplar centre and 2.9% (95% CI: 2.8, 3.0) elsewhere (log rank test $P < 0.001$). Of 6,230 THRs performed in the exemplar centre, 99.9% used the same femoral stem. After restricting analyses to this stem, crude survival from other units was 2.3% (95% CI: 2.2, 2.4) (log-rank test $p = 0.05$). Age and sex adjusted analyses, restricted to the same stem/cup combinations as the exemplar centre, show no demonstrable difference in restricted mean survival time between groups ($p = 0.28$).

These results suggest the "better than expected" performance of an exemplar centre can be replicated by adopting key treatment decisions, such as implant selection. These decisions are easier to replicate than technical skills or system factors. This is an important and easily applicable lesson for all branches of medicine highlighting the potential pre-eminence of decision making over technical expertise.

Disclosure: AJT and MJW receive royalties in relation to IP for orthopaedic implants discussed in this paper.

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THE USE OF CELL SAVER TECHNOLOGY IN REVISION TOTAL HIP ARTHROPLASTY FOR ASEPTIC LOOSENING VERSUS PROSTHETIC JOINT INFECTION: AN UNDER-UTILISED RESOURCE?

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Introduction: Revision Hip Surgery is a recognised risk factor for allogenic blood transfusion requirement. The use of intra-operative autologous red blood cell salvage technology is indicated in revision hip surgery, and has been associated with a reduction in dependence on allogenic blood transfusion requirements following revision hip arthroplasty. This study aimed to quantify the use of cell saver technology in revision total hip arthroplasty for both aseptic loosening (AL) and prosthetic joint infection (PJI).

Methods: Retrospective analysis of all patients undergoing revision THA for either AL (Group 1) or PJI (Group 2) within a single tertiary revision arthroplasty unit over a two-year period. Autologous Cell Saver was used in all cases, and data for estimated blood loss at surgery, volume of autologous blood re-transfused, and post-operative allogenic blood transfusions requirements were calculated for each group.

Results: One hundred and sixty-two patients underwent single stage revision THA for suspected AL, and 64 patients for PJI were identified. The mean average intra-operative blood loss in group 1 was 906.5 mls and 1353.1 mls in group 2 ($p < 0.05$). In group 1, 104 patients (64.2%) had sufficient intra-operative blood loss to allow autologous blood processing and transfusion, in comparison to 50 patients (78.1%) of patients in group 2 ($p < 0.05$). In group 1, 39 patients (24.1%) required additional allogenic red blood cell transfusions within five days of the operation, in comparison to 27 patients (42.2%) in group 2 ($p < 0.05$).

Discussion and conclusions: Significantly higher blood loss, autologous transfusion rates, and use of allogenic blood transfusion were observed in revision THA for PJI compared with those for AL. This highlights the greater need for awareness of potentially increased blood loss in revision THA for PJI and highlights the benefits of using cell saver technology in such cases.

Disclosure: Nothing to disclose.