

## P01 Complex primary THA

P01-305

RISK FACTORS ASSOCIATED WITH PERSISTENT CHRONIC OPIOID USE FOLLOWING THA  
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**Introduction/objectives:** An understanding of patient characteristics associated with persistent-chronic opioid use after total joint arthroplasty (TJA) will allow surgeons to better manage these patients. Our study aims to identify risk factors among preoperative chronic opioid users who continue to chronically use narcotics after total hip arthroplasty (THA).

**Methods:** A retrospective analysis was performed on 256 THA recipients using the state's mandated opioid monitoring program to identify preoperative chronic opioid users. Chronic users were stratified into two cohorts based on their use 6 months after surgery: 1) persistent-chronic, and 2) previous chronic users. Patient demographics and relevant histories were abstracted and comparatively assessed between the cohorts. In addition, an analysis was performed to calculate which preoperative opioid dose was most predictive of chronic use.

**Results:** Within the study population, 54 patients were identified as preoperative chronic opioid users. Of these, 13 (24.1%) were identified as persistent-chronic users 6 months following surgery. Specific characteristics associated with a higher likelihood of persistent-chronic opioid use included: male gender, ASA score >2, and Medicare as a payer type. A 33 mg/day morphine-equivalent dose consumption prior to surgery was most predictive for persistent chronic opioid use.

**Conclusion:** Our study demonstrates that patients who are male, have an ASA >2, and use Medicare are at greater risk for persistent chronic opioid use. Thus, given the poor outcomes associated with chronic opioid use, these findings may help guide surgeons' clinical decision-making process when encountering patients with a history of opioid use.

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THE ROOF STEP CUT TECHNIQUE FOR COTYLOPLASTY IN HIP OA SECONDARY TO DYSPLASIA  
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**Introduction/objectives:** Developmental dysplasia of the hip (DDH) is one of the most common causes of secondary osteoarthritis in early adulthood. The femoral head is partially or fully uncovered, the rotational center is displaced laterally and cranially. According to the literature the question of cup positioning during THR is still unresolved for many surgeons. In our belief we have to do our best to restore the primary rotational center.

**Methods:** When the supero-inferior acetabular diameter is higher than the sagittal one is, we are using our own technique, the so-called Roof Step Cut (RSC). The femoral head is used as an L-shaped graft onto the previously accordingly prepared proximal pole and secured with two screws and a double washer. This way we can achieve a full proximal cup covering allowing generally the use of an uncemented cup.

**Results:** Between 2008-2018 we applied the RSC in 44 cases. Among them there were 15 Hartofilakidis A, 25 B and 4 C cases. 4 cups were cemented and 41 uncemented. All our patients are followed. Until now no complication of bone healing or implant loosening has occurred. To check the graft integration we followed the patients at the beginning of the technique by bone scintigraphy. Its systematic use had been abandoned since the good result is also proved by the good radiological and functional outcome. The final graft and cup integration is estimated between 6 and 12 months.

**Conclusion:** Keen to restore the original hip center, in our belief the primary THA, when we have the last chance to handle with a voluminous bulk bone autograft, our duty is to assure a large cup covering. As those patients are relatively young at the time of the first intervention, an eventual revision is less demanding if the bone stock had been augmented previously.

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## P01 Complex primary THA

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DUAL OFFSET METAPHYSEAL-FILLING STEMS IN PRIMARY TOTAL HIP ARTHROPLASTY IN DYSPLASTIC HIP  
AFTER A MINIMUM FOLLOW-UP OF 10 YEARS  
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**Introduction/objectives:** The aim of this study was to assess the long-term performance of tapered one-third proximally coated stems in Crowe type II and III dysplastic hips.

**Methods:** This study included 135 dysplasia patients (150 hips) who underwent a total hip arthroplasty and had a minimum follow-up of ten years. Single design tapered stems were used in all patients. There were 112 women (83%) and 23 men (17%) with a mean age of 45 years (23 to 72) at the time of surgery. The mean follow-up was 14.7 years (10 to 16.8). For clinical evaluation, the Harris Hip Score and Merle D'Aubigne scale were used preoperatively and at the final follow-up. Implant survival was calculated using Kaplan-Meier survivorship analysis, with failure defined as a component revision for any reason.

**Results:** Overall, one stem was revised for a deep infection. There were no other femoral stem revisions secondary to loosening, wear, periprosthetic fracture or instability. Radiographic evaluation showed excellent stem osteointegration in all cases. Kaplan-Meier survivorship, with stem revision for any reason as the end point, was 98% at 14 years (95% confidence interval 92.5 to 99.8).

**Conclusion:** This study demonstrates that a dual offset tapered stem achieved excellent survivorship and stability, as well as good clinical outcome scores with minimal thigh pain and stress shielding in patients with arthritis and developmental dysplasia of the hip; a dual offset tapered stem may be a suitable option for primary total hip arthroplasty in this group.

## P01 Complex primary THA

P01-405

ALLOPLASTIC RECONSTRUCTION OF LIGAMENTUM TERES FEMORIS IN UNIPOLAR HIP ARTHROPLASTY  
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**Introduction/objectives:** Unipolar hip arthroplasty with prostheses head made of metal or polymer (Moor type) is commonly used in senile patients. One of its complications is dislocation (5-25 % cases). It is caused, in our opinion, by changing physiological biomechanics in hip joint as a result of cutting the ligamentum teres femoris. The aim was to evaluate the benefits of the ligamentum teres femoris reconstruction in unipolar hip arthroplasty.

**Methods:** The core of developed technique is that the Moor type prosthesis is fixed in the acetabulum and in the femoral bone with an artificial ligament guided through the canal in the head, neck of the prosthesis and proximal end of femoral bone. It is fixed on one side in the acetabulum and on the other side in subtrochanteric region. The ligament contain dumbbell-shaped stop, which is placed in pelvic cavity through a hole made in the acetabular fossa. Prosthesis head, neck and stop are made of bioinert polymer polyamide-12, stem is made of titanium alloy. The technique was used in 17 patients (8 men, 9 women, average age 77.3). There were 15 patients with acute subcapital neck fractures, 2 patients with femoral neck pseudoarthrosis.

**Results:** All patients successfully underwent surgery. Active motion exercises in the joint were started next day after surgery. Patients were allowed to sit up in bed and walk with crutches partially weight-bearing operated limb. Results were followed-up in 16 patients for up to 7 years. There were no cases of instability or dislocation of prostheses.

**Conclusion:** Reconstruction of ligamentum teres femoris in unipolar hip arthroplasty restores normal biomechanics in hip joint, prevents dislocations, facilitate rehabilitation in elderly and senile patients, and provides positive medical-social effect.

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## P01 Complex primary THA

### P01-271

CONVERSION TOTAL HIP ARTHROPLASTY FOLLOWING FAILED CEPHALOMEDULAR NAIL FOR INTERTROCHANTERIC HIP FRACTURES

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**Introduction/objectives:** Failure mechanisms following reduction and fixation of intertrochanteric hip fractures (IHF) with a cephalomedular nail (CMN) may include device penetration into the joint, avascular necrosis, secondary osteoarthritis and non- or mal-union. The purpose of this study was to evaluate the clinical results of conversion total hip arthroplasty (CTHA) following failed CMN in the treatment of IHF.

**Methods:** Twenty-eight patients (17 female) requiring CTHA for the treatment for failed IHF between 2013 and 2016 were retrospectively reviewed. Thirteen were proximal femoral nails (PFN), 9 trochanteric femoral nails (TFN), and 6 Gamma nails. Average age at failure was 72.7 years (range 56-91), and mean time from index surgery to CTHA was 14 months (range 7-20 months). Revisions consisted of 24 uncemented cups (86%) and 4 cemented acetabular components. Bone graft was used in 6 cases due to laminar nail protrusion. In 23 cases, a cementless distally-fixed modular stem was used; and in 5, a cemented stem was necessary due to the absence of an acceptable press-fit.

**Results:** Average preoperative HHS was 41 (range 37-51) and increased to 86 (range 76-92) at most recent follow-up. Complications included abductor deficiency in 10 patients requiring assistive walking aid. We found 2 cases of dislocation treated with closed reduction, 1 surgical site infection treated with irrigation and debridement and 1 aseptic loosening treated with revision surgery.

**Conclusion:** CTHA is a viable rescue method for osteosynthesis failure following intertrochanteric fractures. However, a higher complication rate may be expected with this treatment.

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### P01-267

TOTAL HIP REPLACEMENT IN NEUROMUSCULAR DISORDERS

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**Introduction/objectives:** The neuromuscular disorders vary a lot regarding etiology and muscular pathology ranging from complete muscle paralysis to muscle rigidity and stiffness which all endanger the implant stability and gait after total hip replacement. Total hip replacement is a challenging task in patients with neuromuscular abnormality who are susceptible to high risk of instability. This is a prospective study to evaluate hip replacement for these patients

**Methods:** Total hip replacement were performed for two cases of poliomyelitis, four cases parkinsonism, eight cases post stroke, one case after Guillain Barrie syndrome and one case with myasthenia gravis. ALL cases were subjected to full neuromuscular examination and the used implants for such group of patients included femoral head thirty two millimeter size and dual mobility cups to improve the postoperative stability.

**Results:** All cases had significant improvement in the Harris hip score with good post operative stability and function and no postoperative dislocation.

**Conclusion:** Neuromuscular deficient patients can achieve excellent postoperative stability and function after good preoperative assessment and implant choice.

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## P01 Complex primary THA

### P01-428

MORBI-MORTALITY OF TOTAL HIP ARTHROPLASTY IN PATIENTS WITH A HIGH PREOPERATIVE SURGICAL RISK

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**Introduction/objectives:** Total Hip Arthroplasty (THA) has been recognized as the most successful surgery of the 20th century. However, the surgical risk is not homogeneous in all patients and may be conditioned by the presence of previous pathological history of them. The American Society of Anesthesiology (ASA) tries to classify the surgical risk of patients preoperatively based on their previous pathologies. At present there is not enough evidence to demonstrate the risk-benefit of THA in patients with a high preoperative surgical risk

**Methods:** This is an observational study of cases and controls in a proportion 1:3. The population studied are formed by patients who underwent total hip arthroplasty in our medical center between 2010 and 2013. The cases are defined as those patients classified preoperatively with high surgical risk (ASA-IV). The controls were selected from the same population among those patients classified preoperatively with a moderate surgical risk (ASA III). Three controls were selected for each case matched by age, sex, follow-up time and year of the surgery.

**Results:** A total of 10 patients were classified preoperatively with an ASA-IV surgical risk compared to 30 patients with surgical risk ASA-III. 60% of patients in the ASA IV group presented postoperative complications Vs 20% of ASA-III group. There were no differences in total number days of admission. In both groups was found an average of 7 days. The death rate of ASA-IV patients was significantly higher than the death rate in ASA III patients (80% Vs 10%).

**Conclusion:** Patients classified with a high surgical risk (ASA IV), have an 8 times higher risk of having a death at 3 years of follow-up. However, it does not seem that the risk of death is directly related to the surgical procedure

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### P01-36

TOTAL HIP ARTHROPLASTY WITH SHORTENING FEMORAL OSTEOTOMY (WITH THE S-ROM STEM) FOR CROWE TYPE IV DEVELOPMENTAL DYSPLASIA

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**Introduction/objectives:** Total hip arthroplasty in developmental dysplasia of the hip is a demanding procedure. The optimal surgical treatment for the patients with high dislocation of the hip remains controversial. The aim of this study was to assess outcomes after cementless hip arthroplasty with transverse shortening subtrochanteric femoral osteotomy with the use of S-ROM stem for dysplasia Crowe type IV of the hip.

**Methods:** This retrospective study included 19 patients (24 hips) with high dislocation of the hip. The average age of patients at surgery was 49.9 (range: 22-68) years. The surgeries were performed in between 2007 - 2012. Patients were evaluated clinically and radiographically, using the Harris Hip Score during the year 2017. Statistical analysis included Student's t-Tests (p=0.001)

**Results:** The mean follow-up period was 82(range: 60-122) months. The average Harris Hip Score improved from 43,9 to 79,0. The mean leg length discrepancy decreased from 5cm preoperatively to 2,8cm at the final follow-up. All acetabular components were implanted into the true acetabulum and all prostheses were stable at the last examination. No neurovascular damage was recorded. We have identified specific complications in 7 hips (29,1%) in total: intraoperative femoral fracture requiring fixation in 4 hips, 3 hips (12,5%) need revisions: recurrent dislocation with the need of cup reorientation in two (in one of them with the need of resection of heterotopic ossifications in next stage) and aseptic stem loosening with the need of one-staged revision in one hip. All osteotomies healed within less than 8 months.

**Conclusion:** Hip arthroplasty with transverse shortening femoral osteotomy with S-ROM stem is sufficient treatment method in patients with Crowe type IV dysplasia in mid-term.

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### P01-178

HARTOFYLAKIDIS TYPE II AND III DDH: LOW OFFSET EXETER CEMENTED STEM; EXCELLENT SURVIVAL IN 5-YEAR FOLLOW-UP IN 40 PATIENTS

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**Introduction/objectives:** We present the mid-term functional and radiological results of THA in patients with Hartofylakidis type II and III DDH who underwent cemented THA with low offset small cemented Exeter stem +/- shortening osteotomy.

**Methods:** Data were extracted for the Arthroplasty Registry Thessaloniki. 40 patients suffering from Hartofylakidis type II / III DDH managed with a low offset (30, 33.5 and 35.5) Exeter cemented stem between 2010 and 2017 were included. In all type III Hartofylakidis dysplasia shortening derotational osteotomy was also accomplished. An uncemented Trident Stryker cup with screws was used for the cup reconstruction, augmented either with figure of seven or with deepening of the socket.

**Results:** The mean age of patients was 41.5 years. The mean duration of follow up was 5.2 years. 33 hips presented type II, while 7 type III Hartofylakidis dysplasia. The osteotomy union occurred in all patients with type III dysplasia. The mean Harris hip score improved significantly at the last follow-up ( $p=0.001$ ). There was an early dislocation managed with a revision to a constrained liner and a temporary sciatic nerve paralysis postoperatively. Two hips showed osteolysis in Gruen zone 1 and 2 hips showed osteolysis in zone 1 and 7. No implants were revised, and no signs of component loosening and stem subsidence were observed at the last follow-up visit. The survival rate was 100% at 5 years with revision due to aseptic loosening as the endpoint.

**Conclusion:** The short offset Exeter stems +/- subtrochanteric shortening osteotomy in THA for patients with Hartofylakidis type II and III DDH have good clinical results with small risk of complications. The short offset Exeter stems are a safe, durable and good solution for the balance of DDH deformity.

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### P01-165

TOTAL HIP ARTHROPLASTY AFTER TRANSTROCHANTERIC ROTATIONAL OSTEOTOMY FOR OSTEOECROSIS OF THE FEMORAL HEAD: EVALUATED WITH ADIOGRAPHS AND COMPUTERIZED TOMOGRAPHY  
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**Introduction/objectives:** Few reports using computerized tomography (CT) are available regarding the study of total hip arthroplasty (THA) after transtrochanteric rotational osteotomy (TRO) for osteonecrosis of the femoral head (ONFH). The purpose of this study was to compare the outcome of THA after TRO for ONFH with that of primary THA using radiographs and CT.

**Methods:** We retrospectively reviewed twelve hips in 12 patients who underwent THA after TRO for ONFH (post osteotomy group) and compared them with thirteen hips in 12 patients who underwent primary THA (primary group) during the same period. We used one design of cementless implant. All patients were followed for at least 2 years (mean, 3.6 years; range, 2.0 - 6.0 years) after THA. A clinical assessment was performed preoperatively and at the latest follow up using Japan Orthopaedics Association Hip Score (JOA Hip Score). A radiographic examination was performed after THA and at the latest follow up. Contrast-enhanced CT was performed 1 week after THA in order to identify venous thromboembolism. Data were analyzed appropriately using the Wilcoxon test, the Mann-Whitney U test and the chi-square test.  $P < .05$  was considered statistically significant.

**Results:** JOA Hip Score improved significantly at the latest follow up over the preoperative value in both groups. No significant differences were observed in complications between the two. However, from the CT scan, we found that the cup anteversion angle was lower ( $P = 0.0465$ ) and the stem anteversion angle was higher ( $P = 0.0498$ ) in the post osteotomy group than in the primary group.

**Conclusion:** The present study reveals the effectiveness of CT in assessing THA after TRO for ONFH.

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## P01 Complex primary THA

### P01-351

LEGG-CALVÉ-PERTHES DISEASE CAN LEAD TO ACETABULAR RETROVERSION

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**Introduction/objectives:** Legg-Calvé-Perthes disease (LCPD) is a childhood hip disorder that typically leads to a femoral head deformation with an increased risk of osteoarthritis. It is unknown if acetabular version is affected by the disease. In addition, it is impossible to directly evaluate acetabular version on the radiograph in these young patients due to the non-ossified anatomy. We asked if LCPD affects acetabular version?

**Methods:** We performed a retrospective case-series with 80 patients (80 hips) diagnosed with unilateral LCPD at the pediatric outpatient clinic. Patients were aged  $6 \pm 2$  (2 - 12) years at diagnosis. Hips who had undergone previous hip surgery were excluded. Staging of disease was performed according to Waldenström (I - IV). Radiographic follow-up was  $7 \pm 4$  (2 - 23) years. Since the radiographic anatomy of the non-ossified acetabulum cannot be directly evaluated, the validated indirect parameter pelvic width index (PWI) was assessed for each disease stage for the affected and unaffected hip. Retroversion was defined by a PWI  $< 45\%$ , according to the literature.

**Results:** LCPD can result in acetabular retroversion. Over the course of the disease the prevalence of acetabular retroversion changes. At the initial stage of LCPD (Waldenström I) acetabular retroversion was present in 47% (12% in contralateral hip;  $p < 0.05$ ), in the fragmentation stage (Waldenström II) in 66% (6% in contralateral hip;  $p < 0.05$ ) and after complete healing (Waldenström IV) in 35% (20% in contralateral hip;  $p < 0.05$ ).

**Conclusion:** LCPD can lead to acetabular retroversion. The prevalence of acetabular retroversion changes over the course of the disease. Retroversion is most often found in the fragmentation stage and partly reversible after complete healing.

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### P01-501

TOTAL HIP ARTHROPLASTY IN SICKLE CELL ANAEMIA AND ITS CHALLENGES

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**Introduction/objectives:** Sickle cell disease is a condition more prevalent in Africans. Patients with this condition are at increased risk for developing avascular osteonecrosis (AVN) of the femoral head and early secondary hip osteoarthritis. Total hip arthroplasty (THA) is frequently indicated for treatment but procedural challenges and perioperative complications can make these cases difficult. We report a case of THA in a patient with sickle cell disease and secondary proximal femur osteoarthritis due to osteonecrosis, show difficulties and how to avoid complications.

**Methods:** Clinical history, physical exam, interpretation of complementary diagnostic tests and bibliographic review.

**Results:** We present a case report of an African 37 years old female who developed proximal femoral AVN and was admitted to cementless THA. Pre-operatively X ray showed FICAT IV AVN and a Dorr A femoral canal. Flexible guided reamers were requested for the surgery. Intra-operatively we identified metaphyseal bone sclerosis with femoral canal obliteration. Drilling of the femoral canal under image control was necessary to advance guide wire for flexible reamers. There was metaphyseal perforation A1, filled with bone graft and cementless THA was performed. Patient developed acute hemolytic anemia in the post op period with multiple transfusions needed. There was no other complication in the post op. At 1 y of follow up patient is ambulatory and satisfied with hers THA.

**Conclusion:** THA in patients with secondary osteoarthritis due to AVNV in sickle cell disease can be very demanding. Surgeon must be prepared for femoral canal obliteration and an increased risk of intra op complications namely fracture. Close monitoring of hemoglobin should be performed as these patients are prone to hemolytic anemia.

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## P01 Complex primary THA

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THA IN PATIENTS WITH HAEMOPHILIA: DA APPROACH IS AN ASSET  
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**Introduction/objectives:** Hip arthroplasty in patients with haemophilia is not as common as knee, elbow and ankle arthropathy. However, end stage arthropathy of the hip needs total hip arthroplasty (THA) in these patients. THA in patients with haemophilia is associated with higher incidence of complications including blood loss. We conceive this study to see if using direct anterior (DA) approach for THA in patient with haemophilia could affect complications especially blood loss

**Methods:** In our prospective institutional database, we identified 13 patients who underwent THA through DA approach between January 2011 to January 2016. 12 out of 13 patients had severe hemophilia A (<1% Factor VIII) and one had severe hemophilia B (<1% factor IX). One patient (two hips) had high titre on inhibitor. Cementless prostheses (cup and stem) were inserted via DA approach in all patients

**Results:** we had 13 male patients and 15 hips (two simultaneous bilateral patients) who were followed-up for 36 months (range, 12 to 74). The average blood loss was 550cc (300-850cc). Mean operation time was 65min (55-90min). we had no serious complications such as hematoma, deep vein thrombosis(DVT) or infection. Only one patient needed blood transfusion. The mean Harris Hip Score improved from 46 (ranged,38-53) to 83 (ranged, 50-97) (p<0.05)

**Conclusion:** DA approach is a viable option for patient with bleeding tendency in terms of reducing blood loss and subsequent complications. IT needs to be done by surgeons who have already passed their learning curve for this approach

## P01 Complex primary THA

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A NOVEL TECHNIQUE TO REMOVE MOORE'S PINS DURING CONVERSION TOTAL HIP ARTHROPLASTY  
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**Introduction/objectives:** Historically, Moore's pins have been used in the management of subcapital femoral fracture and slipped upper capital epiphysis. Moore first described the use of this technique and pins for fractures of the hip in 1934.

A disadvantage of using Moore's pins is difficulty in extraction which is well recognised. High incidences of complications have been reported such as failure to extract pins, pin breakage during extraction, excessive excavation of lateral femoral cortex and sciatic nerve palsy. This makes removal of Moore's pins and conversion THA a technically challenging procedure.

**Methods:** Neck osteotomy is performed as usual using the oscillating saw. Once the neck osteotomy is completed, the femoral head should be slide proximally over the smooth portion of the pins, levered with an osteotomy. At this stage the pins are accessible at the neck osteotomy site. Bone ingrowth occurred at the threaded portion of the pins and pins' nuts are usually embedded in the lateral femoral cortex making extraction impossible. A hollow trephine is used sequentially over each pin. The trephine is advanced in antegrade fashion until the lateral femoral cortex is reached. Once the trephine has exited the lateral femoral cortex, the pin and the nut is fully released.

**Results:** We describe a novel technique to remove Moore's pins during conversion THA in 2 cases.

**Conclusion:** A hollow trephine can be used in antegrade fashion after neck osteotomy to remove retained Moore's pins. This hollow trephine is readily available and simple reproducible technique allowed minimal bone loss at the lateral femoral cortex and complete removal of Moore's pins, thus making conversion THA a safe and efficient surgical procedure.

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DIRECT ANTERIOR APPROACH TOTAL HIP ARTHROPLASTY IN THE RETAINED HARDWARE HIP  
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**Introduction/objectives:** The presence of retained femoral and acetabular hardwares may present a unique challenge to orthopedic surgeons during the direct anterior approach primary total hip arthroplasty (DAA THA). Hardware removal frequently necessitates more soft tissue disruption and increased bleeding and operative times and may create stress risers, which increase the risk of peri-prosthetic fracture and slow recovery.

**Methods:** This series reviewed the technique of DAA THA using regular operative table in 20 retained hardware patients, which needed a hardware removal. The types of retaining hardware in our series were including the multiple screws, plate and screws at femur and acetabulum, wiring, dynamic hip screw and proximal femoral nail. All procedures were performed with the use of fluoroscopic guidance on supine position. Prospective data was collected following a published protocol.

**Results:** Clinical results at short-term follow-up had been excellent. At the 6-week, 3-month & 6 month follow up, the mean HHS and WOMAC were significantly improved when compared with pre-operative period. All of the acetabular components were in the Lewinnek zone. The mean blood loss was 525 cc (range: 350-900 cc). The mean operative time was 105 minutes (range: 90-150 minutes). There was no femoral stem subsidence or loosening in our series. There was no leg length discrepancy more than 1 cm. There was no complications required additional surgery. There was no periprosthetic fracture, no dislocation and no meralgia paresthetica found in our series.

**Conclusion:** In our present study showed that the DAA THA could be the safe procedure for the retained hardware patients. This approach provided the faster recovery time, good component position and less pain with less soft tissue disruption.

## P01 Complex primary THA

P01-529

TUMORAL RECONSTRUCTION WITH THE MUTARS MEGAPROSTHESIS: OUR EXPERIENCE  
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**Introduction/objectives:** The proximal and diaphyseal femur is a common location for primary and metastatic bone tumours. With current advances in radiochemotherapy (RQT), surgical techniques and reconstruction options, limb salvage procedures have become the gold standard. Recent literature supports the reconstruction of the proximal femur with megaprosthesis, with reported outcomes with more than 80% of good to excellent functional results. This works presents our experience with the MUTARS megaprosthesis.

**Methods:** We performed a retrospective study, collecting information of all patients treated with the MUTARS megaprosthesis from 01/2010 to 12/2016. Data regarding the patients' sex, age, tumour location, histopathologic diagnose, use of RQT, type of reconstruction used, local recurrence, complications and follow up was obtained.

**Results:** 19 patients were included: 8 male and 11 female, with a mean age at surgery of 52y. There were 4 osteosarcomas, 3 chondrosarcomas, 2 plasmacytomas, 2 osteochondromas, 1 synovial sarcoma, 1 fibrosarcoma, 1 pleomorphic sarcoma, 1 multiple osteochondromatosis, 1 lymphoma, 1 aneurysmatic bone cyst and 2 metastasis. 10 tumours were in the proximal femur and 9 were diaphyseal, prevailing the right limb (11 out of 8). 10 were submitted to RQT. There were 14 proximal and 5 total femur reconstructions. MUTARS were primarily used in 11 cases, and 8 as a secondary reconstruction. Complications were as followed: 1 local recurrence, 2 infections, 1 recurrent dislocation and 1 stem loosening. 2 patients died during the follow up. Mean follow up was 31 months.

**Conclusion:** In our experience the MUTARS megaprosthesis has proven to be a valid and reliable option as a limb salvage surgical procedure in this complex set of pathologies

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## P01 Complex primary THA

### P01-353

#### TOTAL HIP ARTHROPLASTY WITH S-ROM MODULAR SYSTEM IN PATIENTS WITH DEVELOPMENTAL DYSPLASIA OF THE HIP - 10 YEARS RETROSPECTIVE STUDY

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**Introduction/objectives:** Untreated patients with DDH have a higher incidence of hip osteoarthritis which causes severe functional impairment. The complexity of THA in DDH patients is due to pathomorphologic changes of the acetabulum and femurs-ROM modular system provides the surgeon with the ability to independently adjust femoral neck offset, femoral neck-shaft angle and the version angle of the femoral neck. The authors present long term results of modular system THA in DDH patients

**Methods:** A retrospective transversal study included DDH patients who underwent THA using a modular system between January 2000 and December 2010. 2 of these patients were lost in follow-up. Crowe classification was used for DDH categorization. The authors present the preformed procedure, tribological pair, implant sizes, acetabulum positioning, complications.

**Results:** The study focuses on 20 hips of 18 DDH patients. The mean follow-up was 93,14 months. The mean age was 37.8 years. 13 female patients and 5 male patients. Crowe classification: 4 cases type II, 6 cases type III and 10 cases type IV. Metal/polyethylene was the most commonly used tribological pair. The head size varied between 22, 28, 32 and 36. Three cases present with high positioning of acetabulum, 5 case with anatomic setting and 12 cases with medialization of the acetabular component. Acetabular reconstruction was necessary in 9 cases. Femoral osteotomy was done in 5 cases. Early complications included two sciatic nerve lesions, one with partial recovery and another with total recovery, and a superior gluteus nerve lesion. 1 patient underwent revision surgery due to an infection.

**Conclusion:** THA in DDH patients is a challenge procedure with good functional outcome and low revision rate. The modular THA system represents a good solution in DDH patients.

## P01 Complex primary THA

### P01-288

#### FIVE-YEAR RESULTS AFTER CEMENTLESS TOTAL HIP ARTHROPLASTY WITH ANTHOLOGY STEMS FOR DYSPLASTIC FEMURS IN JAPANESE PATIENTS

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**Introduction/objectives:** Hip osteoarthritis (OA) due to developmental dysplasia of the hip (DDH) are common in Japan. Their dysplastic femurs have steep femoral neck angles and narrow medullary cavities, so implant selection for total hip arthroplasty (THA) is sometimes considered. Anthology stems (Smith & Nephew) have a reduced medial curve designed for DDH. We report midterm clinical and radiographic results of THA using Anthology stem.

**Methods:** We retrospectively included 45 joints after primary THA using Anthology stems and followed up for 5 years. All patients were secondary OA due to DDH and female. Mean age was 60 years old. Femoral morphology was determined by Dorr classifications. Bone remodelling around the stem, biological fixation and stress shielding were evaluated radiographically. The Japanese Orthopedic Association (JOA) hip score was used for clinical evaluation.

**Results:** There were 28, 9, and 8 joints classified as Dorr A, B, and C, respectively. In 5 joints(11%), cortical hypertrophy occurred in zones 3 and 5. Spot welds occurred in zones 2, 3, 5, and 6 in 16(13%), 13(29%), 20(44%), and 14 joints(31%), respectively. Biological fixations were bony stable in all joints with no progressive sinking. Stress shielding was 1st degree in 6 joints(13%), 2nd degree in 34 joints(76%), 3rd degree in 4 joints(9%), and one joint had none. Mean JOA hip score was improved from 51 to 92.

**Conclusion:** THA using Anthology stems provided good midterm results in Japanese DDH patients. Although distal fixation generally occurs in dysplastic femur because of narrow medullary cavities, spot welds occurred primarily at the metaphysis of the femur in this study. It means that the metaphyseal fixation was achieved. Anthology stems are considered to adapt to Japanese dysplastic femurs.

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## P01 Complex primary THA

### P01-544

#### DISLOCATION AFTER TOTAL HIP ARTHROPLASTY IN DYSPLASTIC CASES CROWE TYPE 3 AND 4

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**Introduction/objectives:** The aim of this study was to analyze the setting for dislocations and after total hip arthroplasty (THA) in Dysplastic cases crowe type 3 and 4, identify risk factors.

**Methods:** This study included 12 patients with a dislocated hip following THA in Dysplastic cases crowe type 3 and 4 (n=98) between 2005 to 2016. Hospital charts and radiographs of all patients were analyzed.

**Results:** The dislocation rate after primary THA was 12%. Most of the primary dislocations occurred within a short period of time after surgery, thus favouring consecutive dislocations. Female gender, as well as small cup and small head, malpositioned cup and stem were associated with a higher incidence of dislocations.

**Conclusion:** To prevent dislocations after the THA in DDH cases, we suggest largest head size as possible (even by acetabuloplasty) and pay attention to the position of implant.

## P01 Complex primary THA

### P01-454

#### TOTAL HIP ARTHROPLASTY FOLLOWING FAILED INTERNAL FIXATION OF THE PROXIMAL FEMORAL FRACTURES

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**Introduction/objectives:** Despite good outcomes of internal fixation (IF) following hip fractures, some patients experience failure of IF due to several causes. These problems lead to severe pain and disability and necessitate revision surgery. Salvage treatment with total hip arthroplasty (THA) can be considered. In current study, we aimed to investigate the midterm clinical and functional outcomes and incidence of complications of THA for patients with failed ORIF of proximal femoral fractures.

**Methods:** Between 2004 and 2010, there were 44 patients (31 males, 13 females) with failed IF of previous femoral neck fractures (FNF). The age of the patients averaged 36.3±16.1 years. The etiology of the failure included avascular necrosis with collapse in 29 patients, nonunion in 9 patients and nail cut-out or screw breakage with acetabular abutment in 6 patients. Patients were followed for 5.9±3.5 years

**Results:** Two patients had died and 5 were lost due to the changing of the contact information. Intraoperative femoral fracture occurred in one patient. There was no patient with dislocation, deep venous thrombosis and pulmonary embolism. Heterotopic ossification was found in 2 patients. Three patients had developed superficial infection of the surgical wound and were treated with oral antibiotic therapy. Thirty seven patients returned for last visit. Five patients complaint from mild to severe pain and required analgesics. Three patients could not ambulate without crutches. Harris hip score averaged 86.7±15.2.

**Conclusion:** Our findings confirm that THA is an effective and safe salvage procedure for patients with failed IF of FNF and results in satisfactory functional and clinical outcomes.

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## P01 Complex primary THA

### P01-387

IS ONE-STAGE BILATERAL TOTAL HIP ARTHROPLASTY A SAFE PROCEDURE FOR PATIENTS WITH AVASCULAR NECROSIS OF FEMORAL HEAD?

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**Introduction/objectives:** Some surgeons are concerned about safety of stage bilateral total hip arthroplasty (BTHA). In current study, the outcomes and complications of one-stage BTHA through Hardinge approach was investigated in patients with avascular necrosis of femoral head.

**Methods:** There were 72 patients with bilateral AVN of femoral head enrolled in current prospective study. The patients aged 32.3±6.2 years. All of the patients underwent one-stage BTHA. Beside of clinical and radiological evaluations, modified Harris Hip Score (MHHS) was completed for all of the patients, preoperatively and again postoperatively.

**Results:** The mean operational time and hospital stay was 2.5±0.2 hrs and 3.7±1 days, respectively. After the operation Hemoglobin level decreased significantly (13.2±4.1 mg/dL Vs 8.2±2.7 mg/dL; p<0.001). There was no deep venous thrombosis, pulmonary embolism, infection, dislocation and periprosthetic fracture in our study. One patient developed unilateral heterotrophic ossification. The MHHS increased significantly from 45.7±10.2 preoperatively to 93±12.6 postoperatively (P<0.001).

**Conclusion:** Based the findings of current study, one-stage BTHA through Hardinge approach is a safe and useful treatment for patients with femoral head avascular necrosis. However, long term studies are necessary.

## P01 Complex primary THA

### P01-451

TOTAL HIP ARTHROPLASTY IN ASSOCIATION WITH DIGASTRIC TROCHANTERIC OSTEOTOMY AND PROXIMAL SHORTENING. A SOLUTION FOR OLD HIP DYSPLASIA

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**Introduction/objectives:** Symptomatic secondary arthritis is a major at a relatively young age and their treatment is total hip arthroplasty which has a broad spectrum of technical challenges. The purpose of this study is to evaluate the outcomes of cementless THA in patients with severe DDH with a special focus on the results of a unique procedure.

**Methods:** A total 102 patients with Crowe type IV dysplasia underwent cementless total hip arthroplasty (THA) with digastric osteotomy and femoral shortening from February 2009 till March 2014, Tehran, Iran. A prospective analysis of the outcomes of THA was performed. 92 female (90.19%) and 10 male (9.80%) with a mean age of 33.17±7.12 years (range 30 to 40 years) were enrolled. All patients were evaluated clinically and radiologically with serial follow-ups to obtain the possible complications.

**Results:** The mean modified Harris hip score improved from 44 (range: 32 to 56) preoperatively to 80 (range: 76 to 93) at final follow-up, significantly (P<0.0001). At the last follow up none of patients have pain and in radiography, there was no osteolytic lesion, no presence of lucence line, trochanteric non-union, and change in inclination. All of patients had good activity at the last follow up. We reported 7 (6.86%) complications in patients; 3 sciatic nerve palsies, 2 dislocations after falling, one intra-operative femoral fracture and one intra-pelvic cup migration.

**Conclusion:** Cementless total hip arthroplasty using the digastric trochanteric osteotomy and proximal shortening demonstrated excellent short- to mid-term outcomes in most of Crowe type-IV hip dislocations and it is recommended for these subjects.

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## P01 Complex primary THA

### P01-452

TOTAL HIP ARTHROPLASTY: A SOLUTION FOR PREVIOUSLY FUSED HIP

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**Introduction/objectives:** Total hip arthroplasty in previously fused hip is a challenging procedure rarely performed. In our previous experience, the procedure was successful in limited number of patients. In current study, we investigated the outcomes of THA in more patients with a fused hip.

**Methods:** There were 33 patients with previous hip fusion. The patients aged about 28 years at the time of arthrodesis and 52.3 years at the time of THA. The chief complaint was severe LBP in 9 patients, severe ipsilateral knee pain in 14 patients and both in 10 patients. All of the surgeries were performed by the same surgeon (A.T). The patients were followed for 2 years.

**Results:** At the final visit, 27 patients were pain free or experienced mild pain (84%). In these patients the pain intensity decreased from 7.3±2 to 1.4±1 using visual analogue scale (VAS). Harris hip score (65±14 Vs 82±6) and Oxford hip score (33±6 to 18±7) improved significantly after the operation (p<0.001). Four of the remaining patients had severe pain and two others needed assistive devices for ambulation. 2 patients developed heterotrophic ossification. Furthermore, common fibular nerve palsy developed in 4 patients which resolved after 3 months in all of them. Four patients ambulated with limping.

**Conclusion:** Considerable pain relief can be achieved in patients with fused hip using THA. In addition, the functional status significantly improved. However, the procedure is technically demanding and some complications are possible. Furthermore, THA may be not helpful for some cases as expected.

## P01 Complex primary THA

### P01-348

FLUOROSCOPY GUIDED RESURFACING HIP ARTHROPLASTY IN PATIENTS WITH OSTEOSYNTHESIS PLATES

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**Introduction/objectives:** Secondary hip osteoarthritis in patients with a previous osteosynthesis of the proximal femur is a frequent situation. Recommended steps in the case a total hip arthroplasty (THA) needs to be performed are: first, plate removal and then, if the bone quality is adequate, THA

**Methods:** We present 3 patients with a previous proximal femoral osteosynthesis plate and severe hip osteoarthritis that were treated with a fluoroscopy guided resurfacing arthroplasty.

**Description of Technique:** A threaded guide pin was located percutaneously in the anteroposterior and lateral plane using fluoroscopy. The pin guide was driven through the lateral cortex into the center of the femoral neck in both coronal and sagittal planes. The patient was then located in the lateral decubitus position, and was operated through a posterolateral approach, finding the pin guide after dislocation. Routine cannulated instruments and the implant guidelines were used as described for the original surgical technique.

**Results:** At a minimum follow up of 7 years, no femoral neck fractures were observed, and no other complications were related to this procedures.

**Conclusion:** Fluoroscopy guided resurfacing arthroplasty is a valid option to treat patients presenting with a previous proximal femoral osteosynthesis plate, thus avoiding the need for plate removal, a long stem or a staged procedure.

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## P01 Complex primary THA

P01-115

CHOICE OF ACETABULAR CUP IN TOTAL HIP REPLACEMENT SURGERY DUE TO ADULT CONGENITAL HIP DISEASE

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**Introduction/objectives:** To analyze the possibilities of cementless acetabular cup in the reconstruction of the hip joint with Congenital Hip Disease (CHD).

**Methods:** Survey period 2001-13 y, 105 cases are available for retrospective FU. They are extracted from own created data base (dB- Microsoft Access 2010) and evaluated with our software product (Hip Calculator) for X-ray positioning of the cup. Three type cementless acetabular cup are used- 1. Hemisphere monoblock- press-fit; 2. Modular hemisphere press-fit; 3. Modular trapezoidal screwing cup. Operative technique- Medial protrusion (MPT) for insertion of the cementless cup. Used statistical methods: 1. meta-analysis to compare with cement cups (on literature review). 2. ANOVA; 3. Kaplan - Mayer survivorship analysis, with an end point-revision of the implant due to aseptic loosening and migration.

**Results:** Demonstrating excellent survival of the implant- for a Follow Up period at 10 years only 2 cases are revised due to aseptic loosening and migration of the cup.

**Conclusion:** Cementless acetabular cups works successfully in THA due to CHD. It is implant of choice in modern approach for endoprosthesis replacement of the hip with CHD.

## P01 Complex primary THA

P01-116

ADVANTAGES OF THE POSTERIOR APPROACH TO THE HIP JOINT IN ENDOPROSTHETIC REPLACEMENT OF THE DYSPLASTIC HIP ARTHRITIS

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**Introduction/objectives:** To identify and analyze the advantages of the Posterior (PL) versus direct gluteal (DG) in cases of THA due to dysplastic hip OA.

**Methods:** Follow Up period- 2001-15 y. THA via PL approach-42 cs; via DG-63 cs. Main surgical technique for acetabular reconstruction- medial protrusion (MPT). In cases with high riding OA- femoral subtroch. shortening was performed. Formed two groups of patients were subjected to statistical analysis (SPSS-13) and compared on following indicators: 1. Global functionality (Harris Hip Score HHS); 2. Trendelenburg gait- early and late. 3. Early complications- intraop. Fx, inability to secure the cup, neural damage. 4. Late complications- instability- dislocations; neural damages; heterotopic ossification (HTO). Surgical technique in terms of the surgical approach to be used was analyzed.

**Results:** 1. Regarding surgical technique- benefits are accounted in the correct finding the important landmark- tuber ischii; better visual control over the reaming process, better damage control over the surrounding soft tissue envelope. 2. Regarding functionality- advantages in order to avoid late Trendelenburg. 3. Complications- early and late- no statistically significant difference between DG and PL approaches available.

**Conclusion:** PL approach is approach of choice of THR in cases due to dysplastic OA, especially in complex reconstruction via subtroch femoral shortening osteotomy

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## P01 Complex primary THA

P01-455

TOTAL HIP ARTHROPLASTY IN HUMAN IMMUNODEFICIENCY VIRUS-POSITIVE PATIENTS - UP TO A 14 YEAR FOLLOW-UP

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**Introduction/objectives:** Advancements in the management of human immunodeficiency virus (HIV) now permit HIV-positive patients to have lifespans similar to that of HIV-negative individuals. As patients live longer, the cumulative risk of developing advanced degenerative joint disease increases and the need for THA rises accordingly. The purpose of this study was to determine if HIV-positive THA candidates can achieve good long-term outcomes.

**Methods:** This study is a follow-up on a previous study comprised of 41 hips in 31 HIV-positive patients who underwent primary and revision THA between January 2000 and December 2012. Patients with a concurrent diagnosis of hemophilia were excluded. All patient variables including demographics, operative details, clinical follow-up and reoperations were carefully studied.

**Results:** 41 hips in 31 patients were reviewed. Five patients necessitated contralateral THA since the original report. Mean age at surgery was 49.5±8.9 years and mean duration of HIV infection was 22.5±5.6 years. Mean follow-up time was 71.2±41.4 months. Postoperative complications included the development of a pulmonary embolism in 1-hip (2.7%) and infection in 1-hip (2.7%). Follow-up was available on 36 (88%) hips. Five (13.8%) required revision surgery. Two patients (6.4%) expired.

**Conclusion:** Although our study concludes that it is possible to achieve a low incidence of postoperative infection, we demonstrate that HIV-positive patients may be at an increased risk for complications and revision surgery following primary THA. These rates are comparable to the revision rates in non-HIV patients of similar age undergoing primary THA and underscore the advances made in HIV maintenance and treatment.

## P01 Complex primary THA

P01-380

IS PARKINSON'S DISEASE ASSOCIATED WITH WORSE OUTCOMES FOLLOWING TOTAL HIP REPLACEMENT?

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**Introduction/objectives:** Although neurological conditions are widely accepted as a risk factor for worse outcomes following total hip replacement (THR), evidence to support this association is limited and variable. This study aimed to establish whether patients with Parkinson's disease (PD) had worse outcomes following THR in terms of risk of mortality or revision.

**Methods:** Patients who underwent elective THR for primary osteoarthritis between 1999 and 2012 with PD (n = 490) were identified using datasets available through the Swedish Hip Arthroplasty Register (SHAR). A control group was generated, with 1:1 matching for additional risk factors and comorbidities. Risks of revision and mortality were compared at points over the 14 year study period, using Kaplan-Meier and Log-rank testing; p-values less than 0.05 were considered statistically significant.

**Results:** Risk of mortality did not differ at 30 days or 1 year. At 9 years, mortality was increased for PD patients (p<0.001). Overall, mortality for PD patients was higher (p<0.001).

Risk of revision did not differ at 30 days. At 1 year, revision was higher for PD patients (p<0.05). This difference was more pronounced at 9 years (p<0.005). Overall, a higher risk of revision was observed in the PD group (p<0.001).

**Conclusion:** Patients with PD had worse outcomes following THR, with increased risks of revision and long-term mortality. The increased risk of mortality might be principally due to the degenerative nature of PD. We believe our findings provide important context for arthroplasty surgeons when deciding to perform THR on PD patients.

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## P01 Complex primary THA

### P01-28

#### UNCONSTRAINED PRIMARY TOTAL HIP ARTHROPLASTY IN GROSS MOTOR LEVEL 3-4 CEREBRAL PALSY PATIENTS

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**Introduction/objectives:** Primary total hip arthroplasty (THA) has already been described in patients with cerebral palsy (CP). However, little has been reported when such patients are moderately to severely affected by this pathology. We aimed to describe the mid-term clinical and radiological outcome of diplegic CP patients treated with unconstrained THA.

**Methods:** We retrospectively analysed 9 patients with dysplastic coxarthrosis due to CP treated with primary THA between 2006-2014. We excluded 1 case with less than 1-year follow-up and 1 case with Gross Motor Function Classification System (GMFCS) level 1. Of the 7 cases included, 4 were GMFCS level 3 and 3, GMFCS level 4. Mean follow-up was 91 months (minimum, 36). Clinical outcome was evaluated with the modified Harris Hip Score (mHHS) and the visual analog scale (VAS) pain score. Radiographs were examined to identify the cause of complications and the need for revision surgery.

**Results:** All patients showed significantly better functional results when preoperative and postoperative mHHS (42.5 vs. 72.5, respectively;  $p=0.002$ ) and VAS pain score (9.66 vs. 1, respectively;  $p=0.0003$ ) were compared. Two cases presented with an acute periprosthetic infection, of which 1 underwent a 2-stage protocol. At final follow-up, 1 asymptomatic case had signs of femoral loosening; thus, it was conservatively treated. Two cases showed Brooker type 2 heterotopic calcifications that were also conservatively treated. We found no cases of instability.

**Conclusion:** In patients with moderate and severe CP, unconstrained THA showed acceptable clinical outcomes with a marked reduction in pain and without instability. However, potential complications such as infection, loosening and heterotopic calcifications may be more frequent in this population.

## P02 Dual mobility cups

### P02-52

#### CEMENTED DUAL MOBILITY CUPS IN ELDERLY PATIENTS

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**Introduction/objectives:** Cemented Total Hip Arthroplasty (THA) has a lower rate of early revisions and intra-operative fractures when compared to cementless implants in elderly population. Results of cemented Dual Mobility DM metal shells has hardly been reported. This is a prospective study that evaluates the outcome of cemented DM cups in primary THA for elderly osteoporotic patients.

**Methods:** In the period between June 2013 to January 2015 92 patients, 100 hips (8 bilateral) were prospectively evaluated. All patients received primary THA for acute or non united hip fractures and secondary arthritis. Novae stick cups (SERF, France) were implanted following over reaming of the acetabulum by at least 2mm, drilling of multiple anchor holes and cement pressurization. 10 hips received cancellous graft but none of them needed complex acetabular reconstruction. Radiological evaluation of the cup position and cement mantle according to Charnley and Delee 3 zones were performed at 3 months postoperatively and then annually thereafter. This is in addition to Kaplan-Meier survival curve and Harris Hip Score (HHS).

**Results:** At an average 3 years follow up (minimum 2 years) the survival of these cups was 100%. None of these cup was loose or awaiting revision. 1 patient was readmitted for evacuation of subcutaneous hematoma. Radiologically stable, non-progressive radiolucent lines at zone 3 were observed in 6 cups. At the latest follow up the average HHS was 85 (range 79-92). No intra-operative fracture was recorded.

**Conclusion:** One of the main indications for using DM THA is hip fractures in elderly patients with osteoporotic bone. Cemented DM cups have been shown to achieve 100% survival at the short term. Longer term follow up are required.

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## P02 Dual mobility cups

### P02-180

#### DUAL MOBILITY TOTAL HIP ARTHROPLASTY FOLLOWING FAILED FIXATION OF PROXIMAL FEMORAL FRACTURE

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**Introduction/objectives:** Total Hip Arthroplasty (THA) for complicated fracture Neck Of Femur (NOF) has been reported to have good survival but with high dislocation rate. This study reports the early results of Dual Mobility (DM) THA following failed fixation of fracture NOF

**Methods:** Sixty two patients who had DM THA following failed fixation of proximal femoral fractures were prospectively evaluated. The mean follow up was 39 months and minimum of 2 years. The average age was 62 years (range 49-85 years). 24 of these fractures were sub-capital fractures and 38 in the trochanteric area. The underlying etiologies were non-union, secondary arthritis, avascular necrosis, fatigue failure or backing out of metal work and infection. In presence of infection, staged arthroplasty with an interim period of antibiotic loaded cement spacer before implantation of the definitive DM prosthesis was performed in 11 hips. X rays were evaluated at 3 and 12 months and annually thereafter. The Harris Hip Score (HHS) was employed for evaluation.

**Results:** 5 patients had died after the first year leaving 57 for the final evaluation. Cementless DM cups were implanted in 32 patients while cemented were employed in 30. Independent mobilization without aid was achieved in 38 patients, while 15 were using one crutch, 5 with frame and 4 with frame and one assistant. The mean HHS improved from 25 pre to 82 post ( $P<0.001$ ). None of the patients had dislocation of the hip. Two patients were re-admitted to theatre for evacuation of hematoma and one patient had deep infection

**Conclusion:** DM THA achieves excellent postoperative stability and function even in high risk patients who receive this implant following failure of hip fracture fixation

## P02 Dual mobility cups

### P02-538

#### REVISION OF LARGE DIAMETER METAL-ON-METAL THA USING A CUSTOM-MADE DUAL-MOBILITY BEARING.

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**Introduction/objectives:** A reduction of cobalt (Co) and chromium (Cr) generation is a key principal in patients who develop an Adverse Reaction to Metallic Debris & is usually achieved by extraction of the mono block socket. There may be cases in which retention of a well-fixed and orientated socket is beneficial and present least harm. This can be achieved with the use of a custom-made Dual Mobility Bearing (DMB).

**Methods:** A consecutive case series using a custom-made DMB. All cases had a Birmingham Resurfacing Cup with a modular Birmingham head used on-label with the same manufactures stem. After confirmation of LOT codes and a digital measurement of component orientation a compatible custom-made DM head was manufactured and implanted.

**Results:** 19 cases in 18 patients (one bilateral) with a mean age 74 years (63-85). Pre-op the mean Oxford Hip Score (OHS) was 26 (5-47). All patients had a MARS MRI confirming ARMD. Mean pre-op Co was 13.09ppb (2.58-26.33) & Cr 6.78ppb (2.19-30.18). Implant position (degrees) a mean cup inclination of 43.3 (34.0-55.0) & version 17.4 (2.0-28.0) and stem version 4.7 (0.0-14.5).

At 6-months the OHS was 41 (35-48) & metal ion levels had significantly decreased with Co 3.87ppb (0.56-12.84) and Cr 3.06 (0.95-9.31). At a maximum follow-up of 3.8 years one patient, with complete abductor destruction, had required revision to a constrained liner for dislocation.

**Conclusion:** This series highlights potential scenarios where the preservation of a well fixed resurfacing socket maybe beneficial. Those being poor bone stock, severe medical co-morbidity and high dislocation risk. Surgical morbidity is reduced and elevated metal ion levels resolved.

The retention of the Birmingham Socket and the use of a Custom DMB represents a treatment option in selected cases.

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## P02 Dual mobility cups

P02-289

ASYMPTOMATIC INTRA-PROSTHETIC DUAL MOBILITY CUP DISLOCATION WITH INCREASED METAL ION LEVELS: A CASE REPORT AND REVIEW OF CURRENT LITERATURE.

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**Case Study:** Objectives: With increased use of dual mobility cups(DMC) in total- and revision hip arthroplasty surgeons can expect an increase of known and new complications. Intra-prosthetic dislocations (IPD) as well as the modularity of DMC can lead to metal wear. We present a case and show the current literature about this topic to create awareness of this possible destructive problem.

**Methods:** During routine follow up, we observed an asymptomatic patient with an IPD and elevated serum metal ions (cobalt 30.4nmol/L and chromium 539.0nmol/L). Revision surgery was inevitable. Perioperative metallosis and severe wear of the metal shell and metal femoral head supported the IPD. Our literature search was performed by the two authors and focused on DMC, IPD and metal wear.

**Results:** A successful revision of the DMC was performed and serum metal cobalt and chromium decreased rapidly in the following 3 months. The histopathology showed dense histiocytic aggregates which supports tissue reaction to metal. Literature showed that the modularity of the DMC can be a source of increased serum metal ions, create excessive wear and affect implant survival.

**Conclusions:** This case presents an asymptomatic and DMC specific complication which led to elevated serum metal ions, metallosis and revision surgery. Our case and review of the literature may form an argument not to consider DMC for primary cases. Furthermore, we advise regular clinical and radiological follow up and, on indication, metal ion testing for DMCs. Awareness of these complications will help avoiding unnecessary problems for our patients.

## P02 Dual mobility cups

P02-204

IMPACTION GRAFTING AND CEMENTED DUAL MOBILITY CUP FOR FAILED FIXATION OF ACETABULAR FRACTURE

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**Introduction/objectives:** bone loss is a major concern after failure of treatment of acetabular fracture. impaction grafting is an excellent option for restoration of such bone loss but dislocation remains a major concern. Dual mobility total hip replacement is a good option with impaction grafting to restore bone stock and restore patient mobility without fear of dislocation

**Methods:** Between January 1, 2011 and December 31, 2013, we performed a retrospective review on 26 acetabular revision surgeries using IBG and a cemented cup in 26 patients. The indications were acetabular deficiency secondary to failed acetabular fixation or failed conservative treatment of acetabular fractures. During that time patients with acetabular bone defects were treated with a cemented dual mobility cup and impaction bone grafting which was protected by Kerboul ring in massive bone defects. Each revised cup was individually assessed; 16 (37%) only underwent acetabular revision, whereas 7 (63%) underwent revision of both components.

**Results:** The HHS improved from 54 to 88 at the last follow up in the group who have had previous internal fixation for their acetabular fracture and improved from 46 to 92 in the group who have had their initial fractures treated conservatively. Regarding complications one patient had a partial peroneal nerve palsy which was completely recovered by 6 months and two patients with prolonged wound drainage which resolved by early debridement and antibiotics and retention of the components.

**Conclusion:** Impaction bone grafting protected by Kerboul Cross ring combined with cemented dual mobility cups represents a good option for the management of rim and segmental bone loss after the management of acetabular fractures without the fear of dislocation

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## P02 Dual mobility cups

P02-572

USE OF A SOLID BACKED PRESS-FIT DUAL MOBILITY ACETABULAR SHELL IN HIP REVISION ARTHROPLASTY

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**Introduction/objectives:** The objective of this retrospective study was to determine whether a solid, press-fit, dual-mobility acetabular component could be successfully used for revision total hip arthroplasties

**Methods:** A series of revision total hip arthroplasties done by a single surgeon performed with a solid, press fit dual mobility acetabular component was reviewed. We report an average 2-year follow-up (minimum 1 year) on 12 revision total hip arthroplasties treated with solid, press-fit, dual-mobility acetabular components.

**Results:** In this cohort there were no dislocations, evidence of radiographic loosening of the acetabular component, or any other cause of failure with minimum 1 year follow-up. The median HOOS score at 1 year was 91.

**Conclusion:** We conclude that the use of a solid backed, press-fit, dual-mobility acetabular component is an appropriate option for revision total hip arthroplasty when there is no acetabular bony deficiency.

## P02 Dual mobility cups

P02-32

CEMENTATION OF A DUAL MOBILITY CUP INTO A WELL-FIXED CEMENTLESS SHELL IN HIGH RISK PATIENTS

UNDERGOING REVISION TOTAL ARTHROPLASTY

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**Introduction/objectives:** Cementation of polyethylene liners into well-fixed cementless metal shells has become an option during a revision total hip arthroplasty (THA). We report the outcomes of cementing a dual mobility (DM) component into a stable acetabular shell in high risk patients undergoing revision THA.

**Methods:** A single-center series of 10 patients undergoing revision THA with a DM cup cemented into an existing well-fixed shell from 2012 to 2016 were retrospectively reviewed. Failure due to aseptic loosening or instability and implant survival at last follow-up were analyzed. The average age was 79.2 years and mean follow-up was 3 years. Indications were recurrent hip dislocation in 8 cases and intraoperative instability with moderate abductor insufficiency in 2 cases. In cases with recurrent dislocation, etiology of instability was classified by Wera type. Statistical analysis was performed using SAS System v 9.4.

**Results:** At the latest follow-up, Harris Hip Scores improved from 49.3 to 71.3 postoperatively (p=0.098). In the 8 patients with recurrent dislocation, we found 4 cases (50%) of unclear etiology (Wera type 6), 2 cases (25%) with abductor deficiency (Wera type 3) and 2 cases (25%) with late polyethylene wear (type 5). Postoperative recurrent dislocation occurred in one hip (10%), and a Girdstone procedure was performed due to functional impairment and dementia of the patient. Intra-prosthetic dislocations, aseptic loosening of the previous shell or dissociation at the cement-cup interface was not identified.

**Conclusion:** Although the follow-up of this series is short, cementation of a DM cup into a previous well-fixed socket is a viable option to treat and prevent instability after revision THA, without providing constraint at the cement-cup interface.

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## P02 Dual mobility cups

### P02-130

BONE, CEMENT AND DOUBLE MOBILITY: A CONSERVATIVE APPROACH IN COMPLEX PRIMARY AND REVISION SURGERY  
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**Introduction/objectives:** Cementless reconstruction in acetabular revision leads to the replacement of bone by more metal artefacts. Acetabular reconstruction with cement, bone and double mobility is an alternative solution for revision and complex primary hips. We represent the result of 65 revisions and 9 primary hips performed over the last 10 years.

**Methods:** Of the 130 revisions over the last 10 years, 65 were performed with cement, bone graft and double mobility, and this became our favourite acetabular reconstruction method. Paproski type I and II defects were treated with bone impaction grafting and if required, a mesh support. Type III defects were treated with structural allografts, impaction grafts, a Kerboull cross and a cemented cup.

**Results:** Follow up varies between 1 year and 10 years. There were 2 dislocations, both occurring in the same patient, after a left and right hip revision, leading to a revision of the stem in the right hip and the cup and metaphysis of the left hip. One patient underwent DAIR for acute infection. There were no early structural failures and no late loosening.

**Conclusion:** Reconstruction of the acetabulum with bone grafts and cement has several advantages, such as better reconstruction of native acetabular size and center of rotation and reconstruction of bone stock. A double mobility cup is a safe alternative to the use of an all poly cup and increases initial stability. The combination of bone impaction grafting and the use of structural allografts and a Kerboull cross for the more severe defects, is a useful reconstruction strategy in most acetabular revisions.

## P02 Dual mobility cups

### P02-553

DUAL MOBILITY SHELL PROVIDING IMPROVED CLINICAL OUTCOMES WITH NO DISLOCATIONS

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**Introduction/objectives:** Dislocation continues to be one of the most common complications following primary total hip arthroplasty (THA) that dual mobility systems continue to mitigate. Patient-reported outcome measures (PROMs) help clinicians evaluate pain and function, while assessing quality of life and potential complications such as dislocation. The purpose of this study is to evaluate clinical outcomes in primary THA patients receiving a dual mobility acetabular bearing.

**Methods:** Three hundred forty-five cases as part of a non-randomized, post-market, multicenter study received primary cementless THA. The primary objective is absence of dislocation with secondary objectives evaluating PROMs and radiographic analysis. The EuroQol-5D (EQ-5D), Harris Hip Score (HHS), and demographics were collected preoperatively, at 6-weeks, 1, 2 and 3 years postoperative.

**Results:** The study population consisted of 47.8% men averaging 60.9 years and 29.7 BMI. Subjects were diagnosed primarily with osteoarthritis (94.8%). The HHS increased on average from 54.45 preoperatively to 79.8, 92.4, 93.5 and 96.4 points at 6-weeks, 1, 2 and 3 years respectively. This trend was also seen in EQ-5D, with 67.2 preoperative to 78.6, 82.7, 82.4 and 83.3 at 6-weeks, 1, 2 and 3 years respectively. The EQ-5D time trade-off improved from 0.63 preoperative to 0.81, 0.88, 0.91 and 0.92 at 6-weeks, 1, 2 and 3 years respectively. No failures reported for dislocation.

**Conclusion:** Study participants receiving a dual mobility acetabular system showed no dislocations, with significant and continuing improvements through use of PROMs. The dual mobility system used in this study improved patient function and quality of life, while reducing risk of dislocation as seen from preoperative through three years postoperative.

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## P02 Dual mobility cups

### P02-338

ENCOURAGING SHORT TERM OUTCOMES WITH A NOVEL ACETABULAR RECONSTRUCTION CONSTRUCT

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**Introduction/objectives:** Cemented dual mobility cups combined with outer porous cups allows for optimal bony purchase by the outer porous metal shell and a more ideal anatomic orientation by the cemented inner dual mobility cup. The purpose of this study is to report on the clinical outcomes of this novel construct.

**Methods:** A retrospective review of a single center's revision THA cases from January 1st, 2016 to July 1st, 2017 was conducted. Patients that received this novel construct were included. Demographic data including age, gender, body mass index (BMI), American Anesthesiology Society (ASA) score, smoking history, and calculated Charlson Comorbidity Index (CCI) was collected. Surgical details including reason for revision THA, time in years from primary THA, outer shell size, dual mobility cup size, and additional fixations was collected. Outcome information on radiographic assessment for implant fixation, infections, re-operations, periprosthetic fractures, and dislocations was collected.

**Results:** Sixteen patients met the inclusion criteria for the study of which 9 were females and 7 were males. The average age at the time of THA was 61.1 years with an average follow-up of 5.9 months.

**Conclusion:** Our study demonstrates encouraging results with the use of this novel construct in preventing instability after THA as evidenced by the absence of any dislocation or implant loosening. Although this study is limited by the lack of long-term follow-up and sample size, our novel construct shows promising short-term results. Moreover, as the majority of dislocations occur within the first 3 months, we believe that this construct may present as a new technique to solve the challenge of recurrent dislocation and instability following revision THA.

## P03 Fundamental science

### P03-205

SMOKING PATIENTS - FASTER MOBILIZATION? POSTOPERATIVE MOBILIZATION AFTER TOTAL HIP ARTHROPLASTY (THA) MEASURED BY FITBIT® TRACKER

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**Introduction/objectives:** With this study, the postoperative mobilization after total hip arthroplasty (THA) was recorded and analyzed by Fitbit® activity-trackers. How mobile are our patients? Are there gender-specific differences? Has the nicotine addiction of smokers an effect on the postoperative mobilization?

**Methods:** As part of a prospective study, the postoperative mobilization was investigated by Fitbit-trackers between 05/2016 and 08/2017 in 100 patients who received a THA. Out of these 100 patients, 18 were smokers.

**Results:** The average number of steps of all patients on the first postoperative day was 712. On average (during total hospitalization), 1528 steps were completed daily. One day before discharge, the average number of steps was 2165. There were no gender differences in the number of steps at the 1st postoperative day (men 745 vs. women 678). A statistically significant result can be found in the number of steps prior to discharge: on this day, men performed 2483 and the women 1846 steps (p=0.04). In case of smokers/non-smokers there were no differences in the number of steps at the 1st postoperative day, steps before discharge day and in average number of steps per day. However, a statistically significant (p=0.02) result can be found in the number of steps on the 2nd postoperative day (smokers 1785 vs. non-smokers 1104).

**Conclusion:** Overall, the male patients showed greater activity with a greater number of completed steps. On the 2nd postoperative day, the group of smokers could report significantly more steps than non-smokers. Most likely due to the plain fact, that craving for nicotine supported the mobilization since smoking is permitted only outside the hospital building.

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## P03 Fundamental science

### P03-512

#### DOES THE MUSCLE STRENGTH EFFECT THE BALANCE OF LEVEL OF PATIENTS IN EARLY STAGE OF TOTAL HIP ARTHROPLASTY?

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**Introduction/objectives:** Total hip arthroplasty (THA) is one of the common surgical procedures for reducing pain, increasing muscle strength and function in patients with osteoarthritis. In studies, it has been reported that limitations of daily living activities, muscle weaknesses and balance disorders of patients persist after THA surgery. The aim of our study is to investigate the effect of muscle strength on balance level in patients in early stage (post-operative 8th week) of THA.

**Methods:** The study comprised 16 patients (9 female, 7 male) with unilateral THA. Hip and knee muscle strength of patients were assessed with hand-held dynamometer and balance levels were assessed with the Tetrax Computerized Balance Assessment System at 8 weeks postoperatively. Patients were allocated to base on their balance scores (Tetrax score <40.75) and low (Tetrax score <40.75).

**Results:** The mean age of patients with high risk of falling was 45.33 ± 20.12 years, body mass index was 26.47 ± 2.67 kg / m<sup>2</sup>. The mean age of patients with low risk of falls was 57.60 ± 11.52 years and body mass index was 28.55 ± 2.69 kg / m<sup>2</sup>. It was determined that there was no significant difference in hip and knee muscle strength between patients with high and low risk of falls (p> 0.05).

**Conclusion:** There is no effect of muscle strength on the balance levels of the patients in the early stage of THA. Therefore, we believe that the addition of balance exercises to early classical rehabilitation programs and late follow-up and balance analyzes of patients with THA may give more objective and significant results.

## P03 Fundamental science

### P03-253

#### COMPUTER-AIDED DESIGN OF HIP PROSTHESIS: NEW THREE-DIMENSIONAL METHOD FOR THE STUDY OF BONE STRESS PERFORMANCE AT FEMORAL STEM LEVEL

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**Introduction/objectives:** There are many biomechanics studies that try to determine or predict biomechanical performance of a bone under certain types of stress, but unfortunately they are extremely expensive and require ample computing resources. Our study proposes another option with low computing needs, which speeds up the virtual assessment of biomechanical performance of a bone after a placement of an implant.

#### OBJECTIVES:

To show an innovative, cost-effective and easy-to-use tool for the design and work on virtual prostheses in the orthopaedics and biomechanics fields.

#### Methods: MATERIALS AND METHODS:

A comprehensive analysis is run on a computer designed virtual femoral stem, implanted in an also virtual femur, analysing its biomechanical performance using finite elements method. Those models allow calculation of the internal bone stress and a node by node stress comparison before and after the surgery.

In order to visualise the stress changes and evaluate the performance of a new implant design, we use a voxel model.

**Results:** The proposed methodology makes it possible to study the stress states of a bone before and after the surgery. Our study calculates the internal stress state of the bone to enable a global performance evaluation of the bone-prosthesis construct.

**Conclusion:** The application of virtual design and computational analysis using voxel models within the orthopaedic surgery and traumatology is promising. Its application will contribute to the development of new orthopaedic implants, not only of the hip, but also of other anatomic regions. This tool may enable the orthopaedic surgeons and prosthesis designers to run three-dimensional evaluations of the bone remodelling after a surgery.

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## P03 Fundamental science

### P03-255

#### DYNAMIC TRIAL FITTING OF THE CUP, A FEASIBILITY STUDY.

Hooenborg, D.\*<sup>(1)</sup>; de Waard, S.<sup>(1)</sup>; Siersevelt, I.<sup>(1)</sup>; Haverkamp, D.<sup>(1)</sup>

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**Introduction/objectives:** Trial fitting of the acetabular component in/during total hip arthroplasty is traditionally done by trial cups, which do not resemble the real press-fit obtained by the definitive cup. The X-pander<sup>®</sup> was developed to mimic the real press-fit obtained by the definitive cup, to ensure that the definitive cup will have a satisfactory press-fit for initial stabilization. The goal of this study was to judge feasibility of the X-pander by use in clinical practice and requesting the experience of the surgeons by structured surveys.

**Methods:** A total of 44 experienced orthopedic surgeons from 7 European countries performed 79 primary THR and 27 revision surgeries, using the X-pander for judging the press-fit of cup instead of using the traditional trial cup. A structured survey was filled after every surgical procedure regarding feasibility.

**Results:** In 60% of primary THR and 61% of revision THR the surgeon judged the X-pander as giving fairly to much more reliable information than traditional trial cups. In 66% of primary THR and 58% of revision THR the surgeon said that they would consider changing from trial cups to X-pander. In 37% of primary THR and 25% of revision THR was stated that using the X-pander could lead to using less additional fixation (screws). In 51% of primary THR and 50% of revision THR it was stated that the X-pander led to better cup insertion.

**Conclusion:** This first survey among early users shows that the X-pander may be a suitable option and could replace traditional trial cups.

## P03 Fundamental science

### P03-254

#### DYNAMIC TRIAL FITTING OF THE CUP, DOES SURFACE ROUGHNESS INFLUENCE THE JUDGED PRESS-FIT. (A BIOMECHANICAL STUDY)

Hooenborg, D.\*<sup>(1)</sup>; de Waard, S.<sup>(1)</sup>; Siersevelt, I.<sup>(1)</sup>; Haverkamp, D.<sup>(1)</sup>

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**Introduction/objectives:** Trial fitting of the acetabular component is traditionally done by trial cups not resembling the real press-fit obtained by the definitive cup. The X-pander was developed to mimic the real press-fit of the definitive cup. The surface of the X-pander can be manufactured in several surface roughness profiles. The goal of this study was to objectify whether suggested press-fit of the X-pander is influenced by the surface roughness in a biomechanical study on bovine calf acetabula.

**Methods:** The type of animal chosen is a bovine calf. The size of these acetabular varies between 50 and 60 mm, which correspond well with human dimensions. The calf acetabulum is a validated model for testing acetabular fixation. In this biomechanical study three types of surface roughness of the X-pander were compared. The surfaces of the X-pander were defined as full size spikes, medium size spikes and smooth surface. Lever out of the X-pander was compared as a measurement of primary stability with a Mecmesin<sup>®</sup> AFG 2500 N, a digital force gauge and Mecmesin<sup>®</sup> MultiTest 2,5-dV, a Force Measurement Testing Device for Traction Testing with VectorPro MT Materials Testing Software.

**Results:** Lever out of the X-pander was measured in 40 series of experiments where the three roughness surfaces were measured in random order (120 tests). X-pander sizes varied from 48 to 60 mm. Lever out was 21.1 Nm (SD 7.8) for the smooth X-pander, 22.8 Nm (SD 8.3) for the medium size spikes and 20.4 Nm (SD 6.6) for the full size spike group. Mixed model analysis revealed no significant differences between the three surface profiles of the X-pander (p=0.12).

**Conclusion:** The experienced press fit measured by X-pander is purely press fit and not influenced by the surface roughness of the X-pander.

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## P03 Fundamental science

### P03-533

#### DYNAMIC TRIAL FITTING OF THE CUP, IS THE SIMULATED PRESS-FIT RELIABLE?

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**Introduction/objectives:** Trial fitting of the acetabular component is traditionally done by trial cups, which do not resemble the real press-fit obtained by the definitive cup. The X-pander was developed to mimic the real press-fit obtained by the definitive cup, to ensure that the cup will have a satisfactory press-fit for initial stabilization. The goal of this study was to judge whether the suggested press-fit felt by the surgeon relates the definitive press fit of the cup or X-pander by a biomechanical study on bovine calf acetabular.

**Methods:** A biomechanical study was performed with bovine calf acetabula, one serie (n=66) was done in which the feel of the surgeon regarding press-fit was correlated to lever out of the X-pander. One serie (n=19) was done with feel regarding press-fit with traditional trial cup (Stryker Trident) correlated to the lever out of the implanted cup and one serie (n=9) in which lever out of X-pander is correlated to lever out of the implanted cup (size 56 Stryker Trident). Lever out force was measured with a Mecmesin® AFG 2500 N, a digital force gauge and Mecmesin® MultiTest 2,5-dV, a Force Measurement Testing Device For Compression Tests and Traction Testing with VectorPrT Materials Testing Software.

**Results:** The experienced press-fit as felt by the surgeon had a correlation with the measured lever out force of the X-pander ( $r=0,5$   $p<0,001$ ). When correlating the assumed press fit with the traditional trial cup with the lever out force of the placed cup, no significant correlation was found in 19 test ( $p=0,09$ ). Correlation of the cup lever out with X-pander lever-out (n=9 diameter 56),  $r=0,8$  ( $p=0,01$ ).

**Conclusion:** This biomechanical study shows that dynamic trial fitting can give a good indication of achieved press-fit by the definitive cup.

## P03 Fundamental science

### P03-314

#### BIOMECHANICAL GAIT CHARACTERISTICS OF FIXED, LOOSE AND LOOSE SYMPTOMATIC TOTAL HIP REPLACEMENTS

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**Introduction/objectives:** The aim of this study is to compare biomechanical characteristics of walking gait between three groups of individuals with total hip replacement (THR): well-functioning radiographically fixed (fixed), well-functioning but radiographically loose (loose asymptomatic), and symptomatic and radiographically loose (loose symptomatic) THR.

**Methods:** Ten participants will be recruited to each of the three groups. Participants will complete walking trails along a 7m walkway at self-selected velocity. Hip, knee and ankle joint kinematics and kinetics will be recorded using a 10 camera Qualisys motion capture system with ground reaction force data recorded using two embedded Kistler force platforms recording at 200Hz and 2,000Hz respectively. Data will be averaged over 6 gait trials. Peak joint angles, moments and ground reaction forces will be extracted for analysis, along with spatiotemporal parameters. One-way repeated measures ANOVA or Friedman's ANOVA will be used to explore for significant main effects, with Bonferroni corrected pairwise comparisons undertaken post hoc.

**Results:** The results of the study will enable identification of changes in sagittal, frontal and transverse plane hip, knee and ankle joint kinematic and kinetic profiles, and spatiotemporal parameters during walking gait between these three groups.

**Conclusion:** The study addresses a gap in knowledge around the gait biomechanics of patients with loose asymptomatic and loose symptomatic THR. We anticipate that the identification of biomechanical changes in walking gait between these groups may aid early identification of loose or loosening THR, helping to enhance patient after care.

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## P03 Fundamental science

### P03-374

#### ISCHIOFEMORAL IMPINGEMENT SYNDROME AND ANATOMIC VARIATIONS IN THE TROCHANTERIC REGION ON HUMAN CADAVERIC MODELS

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**Introduction/objectives:** Hip pain is one of the most common complains in the orthopedic department, and a challenge in young adults. Recent reports of ischiofemoral impingement syndrome (IFI), may explain some cases of misdiagnosed hip pain and even sciatic pain. The authors present a study of twenty two hip dissections, where were evaluated the presence, characteristics and relations between the ischiatic tuberosity, lesser trochanter, the quadratus femoris and the sciatic nerve. The main objective is to better understand the relations on the ischio-femoral space and the physiopathology of the ischiofemoral impingement syndrome.

**Methods:** The ischiofemoral distance (IFD) was studied, as were the structures included in this space. The quadratus femurs thickness, wide and length were measured. It's relation with the sciatic nerve was evaluated. Sciatic nerve characteristics were studied, including distances to the ischiatic tuberosity and the throchanteric region. The data was analyzed with SPSS.

**Results:** We found that the mean IFD was 2,50cm (SD 1,35), and is gender-dependent, being higher in the females specimens (mean 2,7 cm). In this region the mean of the measured sciatic wide and thickness were 1,40cm and 0,52cm, and the mean wide, length and thickness of the quadratus femoris were 3,92; 4,89 and 1,27 centimeters. The distances from the sciatic nerve to the ischiatic tuberosity and lesser trochanter were 1,47cm (SD 0,60) and -0,24cm (SD 0,72).

**Conclusion:** The results of this study show that possibly there is an anatomical background to the ischiofemoral impingement syndrome. The mean ischiofemoral distance in this sample was 2,5 cm, similar to what is describe in the literature. The IFD was also lower in the male specimens, and so male specimens may be more prone to IFI.

## P03 Fundamental science

### P03-240

#### ANATOMICAL VARIATIONS OF HIP EXTERNAL ROTATORS AND SCIATIC NERVE PATH ON HUMAN CADAVERIC MODELS

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**Introduction/objectives:** The posterior region of the hip is extremely rich in noble and highly variable structures. The aim of the paper was to study the variations involving the sciatic nerve on the posterior aspect of the hip and throughout his course and analyze the relationships between sciatic nerve and external rotators of the hip.

**Methods:** We present a study of twenty two hip dissections, evaluating the characteristics and relations between the hip external rotators and the sciatic nerve on the posterior region of the hip. The Piriformis and Quadratus Femoris were measured, the relation with the sciatic nerve and bone structures were analyzed. The sciatic emerging site and type of ramification were recorded, and its path was studied. The data was analyzed with SPSS.

**Results:** The group included 64% female specimens. 18% of the specimens had a sciatic nerve emerging through the substance of the piriformis. The mean length of the sciatic nerve was 7,9cm (SD 1,25). We found a decreasing tendency of the sciatic wide and thickness throughout its path, going from 2,5 to 1,38 cm wide and from 0,51 to 0,41 cm thick. In 67% of specimens, the sciatic nerve passes posteriorly and in direct contact with the lesser trochanter 0,65cm lateral to its most medial margin. The mean value of the distance from the sciatic to the trochanteric region on its emerging site was 4,8 cm, and this distance was superior in female specimens.

**Conclusion:** This study showed that the anatomy of the region is highly variable, and that 18% of the specimens had variations on the sciatic nerve emerging site. The data also indicate that in most specimens, the sciatic nerve passes in direct contact with the lesser trochanter, a region that is many times approached during hip arthroplasty.

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## P03 Fundamental science

### P03-95

DGEMRIC MRI OF THE HIP CAN DETECT ACETABULAR CARTILAGE DAMAGE CAUSED BY FEMOROACETABULAR IMPINGEMENT - A 3D CT VALIDATION STUDY  
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**Introduction/objectives:** Anterior Femoroacetabular impingement (FAI) is associated with cartilage damage in the anterosuperior region of the acetabulum. But it is unclear whether the cartilage damage occurs at the exact zone of impingement. Therefore we asked: Does the mean acetabular dGEMRIC index differ between superior acetabular clock positions with and without impingement?

(1) Does the acetabular cartilage damage occur at the zone of impingement?

**Methods:** An IRB-approved retrospective comparative study of 21 hips of 21 patients with symptomatic anterior FAI and no osteoarthritis was performed. Delayed Gadolinium-enhanced MRI of cartilage (dGEMRIC) and CT-based 3D impingement simulation software of the same hip were performed. 10 had cam-type FAI, 8 had pincer-type FAI and three had mixed type FAI. Mean age was 30±9 years and 71% were female. 62% underwent surgical treatment for FAI. Clock positions with impingement were defined in CT-based 3D impingement simulation software. T-test and ANOVA were used.

**Results:** (1) Mean peripheral superior acetabular dGEMRIC index for clock positions with impingement were significantly ( $p<0.001$ ) lower (492ms) compared to clock positions without impingement (594ms). (2) The lowest mean acetabular dGEMRIC index (472ms) was located at the zone of maximal anterior impingement (2oclock). Mean acetabular dGEMRIC was significantly lower at 2oclock (472ms,  $p<0.001$ ) and 3oclock (474ms,  $p<0.001$ ) compared to 11oclock (650ms)

**Conclusion:** Maximum acetabular cartilage damage in terms of peripheral acetabular dGEMRIC index was observed at the zone of maximal anterior impingement. Mean acetabular dGEMRIC was significantly lower anteriorly compared to posteriorly. dGEMRIC can be used for diagnosis of acetabular cartilage damage caused by anterior FAI.

## P03 Fundamental science

### P03-481

RELEVANCE OF PELVIC INCIDENCE IN OSTEOARTHRITIS OF HIP LEADING TO ARTHROPLASTY  
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**Introduction/objectives:** The role of pelvic incidence (PI) or other pelvic parameters such as sacral slope(SS) and pelvic tilt(PT) in Total Hip Arthroplasty (THA) due to osteoarthritis(OA) is unclear. Therefore, we undertook this study to evaluate if pelvic parameters have any relevance in THA.

**Methods:** This cohort study piloted on 120 people, 60 normal individuals as control group and 60 who underwent THA due to degenerative joint disease. We measured PI, SS and PT preoperatively in 60 patients with severe OA who underwent THA and compared it with 60 normal individuals. SPSS 20 for windows used to analyze the data

**Results:** Among the 60 patients who underwent THA, PI angle of 55 patients were in normal range of 40-60 with mean PI of 51.5. Three of them had high PI and two patients had PI lower than 40. PT of 51 patients were in normal spectrum ranging between 10 to 25 with mean of 12.1 while 9 patients had pelvic tilt lower than 10. SS of 48 patients were in normal range of 30-50 with mean of 42.6 while 10 patients had SS higher than 50 and two of them had SS lower than 30. In the control group 57 of 60 individuals had normal PI with mean of 52.4, two of them had low PI while one individual had PI higher than 60. PT of 56 patients were in normal range with mean of 12.7 while 4 of them had PT less than 10. 53 individuals in control group had normal SS with mean of 39.4 while 2 had SS lower than 30 and five had high SS angle. Patients with abnormal PI did not show any different outcome of THA than patients having normal PI

**Conclusion:** In respect to the result of our study we conclude that PI angle or other pelvic parameters such as SS and PT are not significant predictors of OA or neither does they envisage the outcome of THA

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## P03 Fundamental science

### P03-504

NERVE GROWTH FACTOR AFFECTS CHARACTERISTICS OF SENSORY INNERVATION AND SYNOVIA OF THE HIP IN RAT.  
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**Introduction/objectives:** Nerve growth factor (NGF) is a promising analgesic target in patients with osteoarthritis (OA). To determine the direct effects of intra-articular injection of NGF into normal rat hips and the time course of pain-related mediator appearance, focusing particularly on both inflammatory and neuropathic pain-related states using local tissues and sensory innervation of the peripheral nervous system including the dorsal root ganglion (DRG). The purpose of this study was to clarify characteristics of histology and sensory innervation in rat NGF model.

**Methods:** We used 36 eight-week-old male Sprague-Dawley rats. 30  $\mu$ l of 1% Fluoro-Gold solution (FG); (Sham-operated group), 30  $\mu$ l of 1% FG with 50  $\mu$ g/ml NGF; (NGF50 group), and 30  $\mu$ l of 1% FG with 100  $\mu$ g/ml NGF; (NGF100 group) were injected into the left hip joints. Histological examination of H-E stain was performed on the synovia. The number of FG-labelled neurons and those with FG-labelling and calcitonin gene-related peptide-immunoreactivity (CGRP-IR) were counted.

**Results:** The NGF groups showed evidence of synovitis compared with the Sham-operated group. At 7 days, the proportions of CGRP-IR FG-labelled to total FG-labelled neurons were 12%, 18%, and 36% in the Sham-operated, NGF50, and NGF100 groups, respectively. At 14 days, the proportions were 13%, 22% and 35%. At 7 and 14 days, the NGF50 and NGF100 groups showed a significantly higher proportion of CGRP-IR FG-labelled neurons than the Sham-operated group.

**Conclusion:** Intra-articular administration of NGF into the hip joint produces a novel rat model for hip pain. The NGF elicits synovitis and expression of CGRP in sensory nerves. Our findings suggest that NGF is involved in hip joint pain transmission.

## P03 Fundamental science

### P03-548

PROSPECTIVE STUDY COMPARING ACETABULAR BONE RESECTION IN HIP RESURFACING AND TOTAL HIP ARTHROPLASTY  
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**Introduction/objectives:** Acetabular bone loss is a major concern in hip resurfacing as treatment of acetabular bone deficiency during revision arthroplasty is demanding and associated with worse outcomes. Despite this, there have been conflicting results from studies regarding removal of acetabular bone when comparing HRA and THA. Our objective is to determine whether HRA or THA is bone preserving on the acetabular side.

**Methods:** We prospectively evaluated the femoral neck size of 509 consecutive hips at the time of primary THA between 2014 to 2018 in an identical manner to when carrying out a HRA. From the femoral neck measurement, we determined the minimum cup size that would be used if the same hip was undergoing a resurfacing and compared it to the actual cup size implanted. The data was analysed using paired t-tests.

**Results:** Overall, we found a significantly larger acetabular cup would have been implanted if the patient underwent a HRA rather than a THA (mean diameter 56.62 mm versus 51.73 mm;  $p<0.001$ ). We also found that the greatest difference in the acetabular cup size was in those patients with larger femoral neck sizes.

**Conclusion:** This study shows that hip resurfacing removes more bone from the acetabulum than total hip arthroplasty for the same patient. This difference is most marked in patients with larger neck sizes. As the optimal resurfacing patient has been shown to be young, active, predominantly male patients who will likely require revision, this loss of acetabular bone stock becomes hugely significant and compromises future surgeries.

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## P03 Fundamental science

### P03-146

#### INFLUENCE OF TOTAL HIP ARTHROPLASTY ON BONE METABOLISM

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**Introduction/objectives:** To determine the pattern and time distribution of bone turnover after total hip arthroplasty.

**Methods:** 39 patients (25 women/14 men) with a mean age of 67.9 years (35-84 years) underwent a THA. Patients with revision arthroplasty, malignancies, renal failure, chronic liver disease and those treated with estrogen, glucocorticoids, bisphosphonates, vitamin D or calcium supplements were excluded. Blood samples were taken 24h preoperatively, during the operation and 24h, 4 days, 3-6-12 weeks postoperatively. Bone formation markers measured: Osteocalcin, bone-specific alkaline phosphatase, procollagen type I C-terminal propeptide. Bone resorption markers measured: Deoxypyridinoline, tartrate-resistant acid phosphatase 5b, N-telopeptide type I collagen.

**Results:** Bone turnover increases after arthroplasty, with all markers showing significant increase. Timing and magnitude of increase vary for each marker. Rise is greater for resorption than formation. Formation initially decreased up to 1-4 postoperative days. An earlier rise in bone resorption markers and a later increase in bone formation markers were found. Resorption markers return earlier than formation markers to baseline. We found no significant differences between males/females.

**Conclusion:** It is clearly demonstrated that a major orthopaedic surgery, such as THA, results to a dramatic change of bone metabolism. An intense bone turnover is the direct result of surgical intervention, contributing both bone formation and bone resorption. As a next step, these data would advise to investigate whether a limited and timely postoperative treatment with some antiresorptive agent, may be in issue for clinical application.

## P03 Fundamental science

### P03-474

#### SEVERITY OF HIP OSTEOARTHRITIS AFFECTS LOWER EXTREMITY COMPENSATORY MECHANISMS IN SPINOPELVIC MALALIGNMENT

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**Introduction/objectives:** Diagnosis and treatment of patients with coexisting hip and spine pathologies can be challenging. Patients with sagittal spinopelvic deformity utilize pelvic tilt (PT) and their lower extremities in order to compensate for malalignment. In patients with lower extremity osteoarthritis (OA), these compensatory mechanisms can be compromised, leading to further disability.

**Methods:** Patients > 18 years with SSD [SVA > 50mm, PT > 25°, or TK > 60°] were included for analysis. Spinopelvic, lower extremity, and cervical alignment were assessed on standing full-body stereoradiographs. Hip OA severity was graded by Kellgren-Lawrence scale (0-4). Propensity score matching was used to control for age and T1 pelvic angle (TPA). Patients were categorized as limited OA (LOA: grade 0-2) and severe OA (SOA: grade 3-4).

**Results:** A total of 997 patients (LOA=929, SOA=68) were identified meeting inclusion criteria. After PSM, 136 patients (SOA: n=68, LOA n=68) were included in the study. SOA had less PT (17.8°±12.6° vs 22.6°±8.4°, p=0.011), TK (42.5°±21.2° vs 52.3°±20.2°, p=0.007), higher SVA (71.6 mm±47.1 vs 40.7 mm±43.9, p<0.001) and T1Spi (+2.3°±6.4° vs -2.6°±5.5°, p<0.001) than LOA. SOA also had a lower SFA (194.3°±12.4° vs 202.4°±9.5°, p<0.001) and AA (5.9°±3.5° vs 7.2°±3.6°, p=0.043), increased P-Shit (49.7mm±39.5 vs 19.7mm±28.4, p<0.001) and increased GSA (7.7°±4.5° vs 5.0°±4.0°, p<0.001) compared to LOA. There was no difference in PI, PI-LL mismatch, LL, KA or cervical alignment (p > 0.05).

**Conclusion:** Patients with coexisting spinal malalignment and severe hip OA compensate by pelvic shift and thoracic hypokyphosis rather than pelvic tilt, likely as a result of limited hip extension.

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## P03 Fundamental science

### P03-340

#### COMPARISONS OF CITATIONS IN WEB OF SCIENCE, SCOPUS, AND GOOGLE SCHOLAR FOR ARTICLES PUBLISHED IN TOTAL HIP ARTHROPLASTY REHABILITATION

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**Introduction/objectives:** The number of citations an article receives is an important indication of its impact and contribution to the clinical world. There is no literature information on the comparison of the number of citations for different databases (web of science, Scopus, Google scholar) of studies performed on total hip arthroplasty rehabilitation. The aim of this study is to compare the citation count profiles of articles published in total hip arthroplasty rehabilitation randomized controlled trials among the citation databases of Web of Science, Scopus, and Google Scholar.

**Methods:** Randomized controlled trials study of 58 articles published in total hip arthroplasty rehabilitation were included between 1998 and December 2016. Total citation counts for each article were retrieved from Web of Science, Scopus, and Google Scholar. For each article, the following features were analyzed: journal impact factor, year of publication, number of citations, citation density, geographic origin, article type.

**Results:** The average number of citations per article was significantly different from 3 databases. Mean scores (with min.-max.) for Web of Science 26.76 (0-186), Scopus 29.53 (0-219), Google Scholar 52.36 (0-348). The difference in the number of citations between the databases was found to be statistically significant. (P < .001 for both comparisons). We did not find a statistically significant association between journal impact factor and the number of citations by Google Scholar, Scopus, and Web of Science databases. (p > 0.005).

**Conclusion:** The rate of citation for studies on total hip arthroplasty rehabilitation is lower than the literature. There is a need for good- quality randomized controlled study for increasing the number of citations.

## P03 Fundamental science

### P03-505

#### A NOVEL, NON-INVASIVE METHOD FOR HIGH-RESOLUTION 3D-MRI BASED VOLUME AND SURFACE CALCULATION IN FEMORAL HEAD NECROSIS: A PILOT STUDY

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**Introduction/objectives:** Size of necrosis is an important predictor for successful surgical treatment of femoral head necrosis (AVN). Current criteria (ARCO criteria) are based on radiographs and 2D MRI only. To use 3D MRI for calculation of (1) necrotic volume, (2) necrotic surface area, (3) for comparison between ARCO stages for size of necrosis.

**Methods:** IRB-approved retrospective study. In the database (2016-2018; 360 hips) 27 patients (mean age 31 years) eligible for joint preserving surgery for AVN and preoperative high-resolution 3D MRI of the hip were identified. Hips were staged according to ARCO: I 3 hips, II 7 hips, III 17 hips. Hips were allocated to the ARCO subclassification for estimated size of necrosis which was assessed on 2D MR images: group A [15% size] 6 hips, group B [15%-30% size] 15 hips, group C [30% size] 6 hips. MR protocol included an isotropic 0.8mm 3D VIBE sequence. Necrotic and vital bone was reconstructed semi-automatically. Mean relative (1) volume and (2) surface area of necrosis (necrotic/femoral head; %) was calculated using specifically developed software. (3) Necrotic volume, necrotic surface area was compared between the 3 groups.

**Results:** (1)Mean relative necrotic volume: 16 ± 16%  
(2)Mean relative necrotic surface area: 22 ± 19%  
(3)Overlap in standard deviation between groups was large.  
Group A: necrotic volume 5 ± 3%; necrotic surface 6 ± 4%.  
Group B: necrotic volume 14 ± 14%; necrotic surface: 20 ± 17%;  
Group C: necrotic volume 33 ± 19%; necrotic surface 41 ± 19%.

**Conclusion:** The ARCO classification to estimate size of necrosis discriminates poorly between actual 3D necrotic volume and surface in hips with AVN. Instead this novel 3D MRI-based technique has great potential to improve preoperative diagnosis.

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## P03 Fundamental science

### P03-333

SLEEP QUALITY IN PATIENTS WITH OSTEOARTHRITIS OF THE HIP

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**Introduction/objectives:** Introduction: Osteoarthritis is a chronic condition, which commonly affects the hip. The disease symptoms manifest as pain and loss of function, leading to a diminished quality of life. Patients with hip arthritis often report nocturnal pain as the disease progresses, yet little is known how hip arthritis affects sleep quality.

**Objective:** The purpose of this paper was to assess how hip arthritis affects sleep quality.

**Methods:** This is a prospective review of patients with a diagnosis of hip osteoarthritis made by clinical and radiographic evaluation. Patients were evaluated using hip specific outcome measures, WOMAC, Hip Outcome Score (HOS), and Modified Harris Hip Score (mHHS). Sleep quality was assessed using Pittsburgh Sleep Quality Index (PSQI). A multiple regression model was used to assess factors associated with poor sleep quality.

**Results:** A total of 106 patients were analyzed, with an average age of 63 years (20-82). All patients had a Tonnis Grade of two or three. The average ASA Classification was 2 and BMI of 29.01(+/-5.88). WOMAC, HOS, and mHHS were significantly correlated with PSQI ( $p < 0.001$ ;  $p = 0.013$ ;  $p = 0.002$ ). WOMAC, SF 12, ASA Classification, and history of obstructive sleep apnea were associated with poor sleep quality in the multiple regression model ( $p = 0.0185$ ,  $0.0001$ ,  $0.0002$ , and  $0.0041$  respectively).

**Conclusion:** Patients with hip osteoarthritis, endorsing a more symptomatic and painful hip, are susceptible to reduced sleep quality. There is a direct correlation between worsening patient reported hip outcome scores and sleep quality. The WOMAC score is an independent predictor of poor sleep quality and patients with poor hip metrics should be screened for sleep disturbance.

## P03 Fundamental science

### P03-421

QUALITY OF RANDOMIZED CONTROLLED TRIAL ABSTRACTS PRESENTED AT THE EUROPEAN HIP SOCIETY OF THE CONGRESSES FROM 2002 TO 2016: AN AUDIT BASED ON THE CONSORT GUIDELINES

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**Introduction/objectives:** The aim of this study is to examine the reporting quality of the randomized controlled trial(RCT) abstracts presented at the European Hip Society(EHS) Conventional Congress between 2002 and 2016 and to assess whether there has been an increase in quality over time.

**Methods:** A total of 2028 abstracts presented were screened retrospectively. Includes studies with RCTs in the title or abstract. Animal experiments, studies on healthy volunteers, and studies that only provide cost-effectiveness data were excluded. All RCT abstracts were then identified and reviewed according to the checklist items provided by CONSORT guideline for abstract reporting. Evaluations were made over 15 items in the CONSORT guideline so registration numbers were not found in reference source. Inter-year comparisons were also performed to determine if there has been an improvement in the quality over time.

**Results:** Sixty-four RCT were included in the final analysis. In the majority of the abstracts, title(72%), study design(73%), procedures(100%), objective(67%), primary outcome measure(66%), number of patients-randomized(72%), primary outcome (83%) and baseline outcome(94%) were reported satisfactorily. There were poor reporting quality for randomization method(92%), blindness(81%), number of patients analyzed(70%), number of patients analyzed(70%), side effect(69%), research allowance(95%). The total point average(TPA) in 2006 was significantly higher than in 2004 and 2008.(respectively  $p = 0.011$   $p = 0.038$   $p < 0.05$ ). TPA in 2012 was significantly higher than in 2010( $p = 0.013$   $p < 0.05$ )

**Conclusion:** The overall quality of RCT abstracts presented at the EHS of the Congresses appears to be intermediate and should be improved for clear, sheer and detailed information to be transferred.

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## P03 Fundamental science

### P03-413

LEVEL OF EVIDENCE OF PRESENTATIONS AT EUROPEAN HIP SOCIETY OF THE CONGRESSES FROM 2002 TO 2016

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**Introduction/objectives:** The usual conventions of the European Hip Society are a platform for sharing and discussing a various of scientific information about the hip, especially the hip surgical. The purpose of this study is to determine the level of the evidence of abstracts presented in 8 usual congresses between 2002 and 2016.

**Methods:** Two reviewers independently retrospectively screened the total of 2028 abstracts presented at the European Hip Society biannual congresses 2002-2016 for clinical evidence. Clinical research included observational studies and trials involving direct interaction between an investigator and human subjects. Biomechanical studies, technique demonstrations, cadaveric studies, and panel discussions were excluded. Two reviewers screened these results for clinical studies and graded the quality of evidence from level I (i.e. randomized trials) to IV (i.e. case series) based on the American Academy of Orthopaedic Surgeons Classification system.

**Results:** In total, two thousand twenty-eight abstract were screened. Thousand six hundred and ninety-nine presentations met the inclusion criteria and were evaluated. 88% of all presentations were therapeutic, 7% were prognostic, 4% were diagnosed and 1% were economic decision and analysis studies. According to years of presentation, the levels of evidence showed a significant improvement between 2010-2012, 2012-2014 and 2014-2016. ( $p < 0.05$ ; respectively  $p = 0.002$   $p = 0.009$   $p = 0.024$ ) There was no significant difference between the other years. ( $p > 0.05$ )

**Conclusion:** There has been a steady increase in the level of evidence reported in the last three congresses. As the importance attached to the development of scientific methodologies increases, we hope that high-quality scientific will increase in the future.

## P04 Hip arthroscopy

### P04-499

ARTHROSCOPIC TREATMENT FOR FEMORAL NECK ENCHONDROMA - CASE REPORT

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**Introduction/objectives:** Enchondromas are benign hyaline cartilage tumours that radiographically present with irregular intra lesional calcification. Surgical treatment is indicated when there is evolution of the lesion or when it becomes symptomatic. It consists on lesion curettage with or without bone grafting and usually it's curative. Hip arthroscopy allows getting good visualization of the central and peripheral compartment of the hip, thereby decreasing the morbidity resulting from the surgery.

**Methods:** A 50 years old female patient was referred with left hip pain. X-Ray and MRI revealed a chondroid lesion located in the medial aspect of the femoral neck with a diameter of 2.8 cm without cortex invasion. After initial treatment with NSAID's of 6 weeks the complaints persisted. The patient was proposed for arthroscopic curettage of the lesion. She underwent hip arthroscopy using the out-inside technique (peripheral access first after a T shaped capsulotomy) for lesion curettage. The femoral neck was visualized after a "T" capsulotomy. Curettage of the lesion was performed under fluoroscopic control. After the enchondroma excision, bone graft was used to fill the defect.

**Results:** After 3 months, the outcome is excellent. She reported a WOMAC score of 85 (63.3 pre-op), an MHHS of 87 (69 pre-op) and a VAS for pain score of 3 (8 pre-op). No radiographic signs of osteonecrosis are observed.

**Conclusion:** Hip arthroscopy is a therapeutic option in dealing with femoral neck lesions, allowing its removal without recourse to an arthrotomy, thereby minimizing the surgical morbidity and improving the recovery of these patients.

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## P04 Hip arthroscopy

### P04-526

#### ARTHROSCOPIC PSOAS RELEASE IN PATIENTS AFTER HIP ARTHROPLASTY.

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**Case Study:** Objectives: In patients with persistent groin pain after hip arthroplasty the iliopsoas tendon can be the cause of the pain. One of the treatment options is arthroscopic release of the iliopsoas tendon. This study evaluates the effect of arthroscopic psoas release on pain and functional outcome in patients after total hip arthroplasty.

**Methods:** We present a case series of 8 patients with psoas impingement after total hip arthroplasty. In 7 patients diagnosis was made with a bupivacaine injection around the psoas tendon which temporarily resulted in pain relieve, in the other patient diagnosis was likely because of physical examination and a clear overhang of the cup of the hip arthroplasty on X-ray. All patients were treated arthroscopically via 2 portals in which the psoas tendon was released. At final follow-up patients were asked to fill in the HOOS outcome score and report on pain and satisfaction after surgery.

**Results:** At time of surgery average age was 64 (range 45-75). Seven patients (87.5%) were female and one male (12.5%). Median final follow-up was 90 weeks after surgery (IQR 60-134). Median domain scores of the HOOS questionnaire were 53 (IQR 35-86) for symptoms, 65 (IQR 29-91) for pain, 53 (IQR 34-81) for activities of daily living, 22 (IQR 8-45) for sports and recreation, and 47 (IQR 23-97) for quality of life. Six out of eight patients (75%) reported improvement on pain and were satisfied at final follow up. Two patients (25%) were not improved after surgery; one patient reported no difference and one patient had experienced deterioration of pain and was unsatisfied.

**Conclusion:** We believe arthroscopic psoas release is a safe and viable treatment option for patients with psoas impingement after total hip arthroplasty.

## P04 Hip arthroscopy

### P04-93

#### HIP ARTHROSCOPY WITH INITIAL ACCESS TO THE PERIPHERAL COMPARTMENT FOR FAI TREATMENT

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**Introduction/objectives:** Hip arthroscopy with initial access to the peripheral compartment (PC) followed by the entry in the central compartment (CC) under arthroscopic vision as several advantages such as the initial portal establishment without traction, minimal capsulotomy in the PC and the CC access under arthroscopic vision decreases the risk of labral and chondral damage. We evaluate the results of arthroscopic FAI treatment using this technique.

**Methods:** Prospective data collection of consecutive patients operated by the first author. Cohort of 120 patients (55 males, 65 females) who underwent arthroscopic FAI treatment. The minimum follow-up was 24 months and the average age was 35.6 y. 53% of the patients had a CAM lesion, 0.8% had an isolated pincer and 45% had combined lesions.

**Results:** We performed cam resections in 120 hips and rim trimming in 59 cases. Labral repair was performed 77% of the hips (medium 3.2 anchors). Complications occurred in 3 patients, one hip dislocation, one case of heterotopic ossification and one patient with a decreased hip flexion force. Three patients had undergone revision hip arthroscopy (2 cases of capsular adhesions and one residual CAM) and another had conversion to arthroplasty. There was a significant improvement of the NAHS from 55 to 84 postoperatively ( $p < 0.05$ ). The alpha angle was corrected from 69.5° pre-op to 45.5° post-op ( $p < 0.05$ ). In the hips with acetabular rim trimming the lateral center wedge angle was 36.5° pre-op and 29.6° post-op.

**Conclusion:** This technique demonstrated very good clinical results in the FAI treatment and adequate correction of femoral and acetabular deformities. Our results are comparable to the published results of the developer of this approach and the results for the technique with initial access to the CC.

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## P04 Hip arthroscopy

### P04-385

#### TREATMENT RESULTS OF LABRAL LESIONS IN ADOLESCENTS.

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**Introduction/objectives:** Labral lesions are well known in the adult population. However less is known about the diagnosis and the optimal type of treatment in de adolescent patient. In this study, we describe the results of treatment of labral lesions in this population.

**Methods:** In a single center cohort study, we analyzed the data of 24 adolescent patients, with labral lesions. The population consisted of football players, gymnastics and dancers. Twenty-six labral fixations by hip-arthrosopy were performed between 2010-2016. Patients characteristics, pre-operative indications, per-operative findings and the treatment were reported.

**Results:** Mean age of surgery was 15.7 years, with a range of 10-17 years. 20 females and 6 males. In all patients the diagnosis was delayed, all had complaints between 1-4 years. In eleven patients, we found isolated labral tear on the MRI. Fifteen showed a labral tear with additional pathology. In all patients, we started with physical therapy focused on core stability. If the complaints existed after 3 months, the were treated with a hip-arthrosopy. During this procedure, the labrum was repaired and the additional pathology was treated. The rehabilitation was partial weight bearing for 4 weeks, treatment with physical therapy for 3 months. After a year follow-up, all patients were satisfied with the results. The mean IHOT was 89. All except one returned to their previous sports level.

**Conclusion:** Labral tears can be the cause of groin-pain in the adolescent population. If we have a better focus on this, the diagnosis can be make better and earlier. Arthroscopic fixation of the tear gives satisfying results and return too sports activity is possible after the rehabilitation.

## P04 Hip arthroscopy

### P04-318

#### FEMORAL RETROVERSION DOES NOT PORTEND INFERIOR MID-TERM OUTCOMES AFTER HIP ARTHROSCOPY: A PAIR-MATCHED CONTROLLED COHORT ANALYSIS

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**Introduction/objectives:** Femoral retroversion suggested as a negative prognosticator for hip arthroscopy. Recent studies have not shown an adverse effect on short-term patient-reported outcomes (PROs). This study reports mid-term five-year outcomes of arthroscopic treatment of hip abnormalities in such patients.

**Methods:** Data was collected on patients who underwent hip arthroscopy between November 2008 and May 2012, with femoral version less equal to 0° calculated with preoperative MRI. Patients were pair-matched 1:1 with patients having femoral anteversion between 10° and 20°, with matches made based on gender, body mass index  $\pm 5$  kg/m<sup>2</sup>, and age  $\pm 5$  years. PROs included mHHS, NAHS, HOS-SSS, VAS, iHOT-12, VR-12, SF-12), and patient satisfaction.

**Results:** A total of 40 patients were identified out of 50 eligible for inclusion (80.0%), and all were pair matched. There were significant improvement from preoperative state in all PRO and VAS scores ( $P < .0001$ ). No differences in preoperative, postoperative, or change in PRO and VAS scores were noted between the retroverted and control patients. Five patients (12.5%) required secondary arthroscopy ( $P = 0.7555$ ), and five converted to total hip arthroplasty ( $P = 0.5458$ ) at a mean 30.5 ( $P = 0.8324$ ) and 30.1 months ( $P = 0.8396$ ). Twenty-seven patients achieved MCID for mHHS ( $P > 0.9999$ ), and the same number achieved PASS ( $P = 0.5823$ ). For HOS-SSS, 24 patients achieved MCID ( $P > 0.9999$ ) and 22 reached PASS ( $P = 0.4564$ ).

**Conclusion:** Patients with femoral retroversion demonstrated favourable outcomes at minimum five-year follow-up after undergoing arthroscopic hip surgery. These outcomes were not inferior to those of patients with normal femoral version.

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## P04 Hip arthroscopy

### P04-302

#### ARE RESULTS OF ARTHROSCOPIC LABRAL REPAIR DURABLE IN DYSPLASIA AT MID-TERM FOLLOW-UP? A TWO CENTRE MATCHED COHORT ANALYSIS

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**Introduction/objectives:** Studies investigating dysplasia in hip arthroscopy are often limited to the short-term and unable to account for demographics that may vary between populations. This study aimed to determine mid-term failure and outcomes for arthroscopic labral repair in dysplasia and compare them to rigorously matched controls.

**Methods:** Primary arthroscopic labral repair performed at two centers, 2008 to 2011, were prospectively collected. Patients with lateral center edge angle (LCEA) <25° were 1:2 propensity matched to controls by age, gender, laterality, BMI, Tonnis grade, and capsular repair. Groups were compared using visual analog pain scale (VAS), modified Harris Hip Score (mHHS), and Hip Outcome Score-Sports Specific Subscale (HOS-SSS). Level of Evidence: 3, Cohort study.

**Results:** 48 dysplastic patients (mean LCEA: 21.6°, range: 13.0-24.9) were matched to 96 controls (mean LCEA: 32.1°, range: 25-52), and followed for a mean of 5.7 years (range: 5.0-7.7). Patients achieved mean VAS improvements of 3.3 points, mHHS of 19.5, and HOS-SSS of 29.0 points (p< 0.01) with no significant differences between dysplasia and controls (p >0.05). Five year revision-free survival was 83% for dysplasia and 78% for controls (p=0.53). BMI less or equal to 30 was associated with increased revision surgery risk (p< 0.01). Age >35 (p<0.05) and Tonnis grade 0 (p<0.01) predicted failure to reach minimal clinically important difference (MCID).

**Conclusion:** With careful selection and modern techniques, dysplastic patients can benefit significantly and durably from arthroscopic labral repair, with similar mid-term outcomes and failure rates to controls. BMI less or equal to 30 was associated with increased revision risk. Age >35 and Tonnis grade 0 predicted failure to achieve MCID.

## P04 Hip arthroscopy

### P04-257

#### THE EFFECT OF COMPLETE TEARING OF THE LIGAMENTUM TERES IN PATIENTS UNDERGOING PRIMARY HIP ARTHROSCOPY FOR FEMOROACETABULAR IMPINGEMENT AND LABRAL TEARS: A MATCH-CONTROLLED STUDY

Domb, B.\*<sup>(1)</sup>; Maldonado, D.<sup>(2)</sup>; Laseter, J.<sup>(2)</sup>; Perets, I.<sup>(3)</sup>; Ortiz-Decllet, V.<sup>(2)</sup>; Chen, A.<sup>(2)</sup>; Lall, A.<sup>(2)</sup>  
<sup>(1)</sup> American Hip Institute, Hinsdale Orthopaedics, Westmont, United States; <sup>(2)</sup> American Hip Institute, Westmont, United States; <sup>(3)</sup> American Hip Institute, Hadassah-Hebrew University Medical Center, Westmont, United States

**Introduction/objectives:** The purpose of this study was to compare the outcomes of patients with femoroacetabular impingement (FAI), labral tears, and complete ligamentum teres (LT) tears to a matched-pair control group with intact LTs.

**Methods:** Prospectively collected data between February 2008 and April 2015 were retrospectively reviewed. Patients undergoing hip arthroscopy included those who had complete LT tear, labral tears, FAI, and minimum two-year follow-up with modified Harris Hip Score (mHHS), Non-Arthritic Hip Score (NAHS), Hip Outcome Score-Sports Specific Subscale (HOS-SSS), International Hip Outcome Tool (iHOT-12), and Visual Analogue Scale (VAS). Patients were excluded for Tonnis osteoarthritis grade >1, previous hip conditions or surgeries, and Worker's Compensation claims. Patients with full LT tears were matched in a 3:1 ratio with patients without LT tears based on age at surgery ± 5 years, sex, body mass index ± 5, capsular treatment, and acetabular Outerbridge grade.

**Results:** Eighteen patients (18 hips) had minimum two-year follow-up and were eligible for matching, resulting in a cohort size of 18 to 54 patients. Patient-reported outcomes scores (PROs) showed significantly improvement in the complete LT tear group with the exception of the HOS-SSS measure. In the intact LT cohort, all PROs significantly improved with no exception.

**Conclusion:** After hip arthroscopy, patients with FAI and complete LT tears reported significant improvement in PROs. Improvements were comparable to a matched no LT tear cohort. Patients with complete LT tears were 3 times more likely to require an eventual THA than a matched control group.

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## P04 Hip arthroscopy

### P04-313

#### PREVALENCE OF GENERALIZED LIGAMENOUS LAXITY IN PATIENTS UNDERGOING HIP ARTHROSCOPY: A PROSPECTIVE STUDY OF PATIENTS' CLINICAL PRESENTATION, PHYSICAL EXAMINATION, INTRAOPERATIVE FINDINGS, AND SURGICAL PROCEDURES

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**Introduction/objectives:** There is little evidence on generalized ligamentous laxity in patients undergoing hip arthroscopy. The purpose is to study the prevalence, clinical presentation, physical examination, intraoperative findings and surgical treatments in such patients.

**Methods:** Data was collected on patients between February 2013 and November 2017 who underwent primary hip arthroscopy. Patients were included if their preoperative Beighton score was 0 (Group 1) or greater equal to 4 (Group 2). Clinical history, Visual Analog Scale (VAS), and modified Harris Hip score (mHHS), Nonarthritic Hip Score (NAHS) and Hip Outcome Score-Sport Specific Subscale (HOS-SSS) were used to measure preoperative pain and function.

**Results:** A total of 1381 patients were included, and 1143 had Beighton scores of 0 (Group 1) or greater or equal to 4 (Group 2). Group 1 consisted of 882 patients (54.1% female), and Group 2 consisted of 261 patients (92.7% female) (P < 0.0001). The relative risk of having Beighton greater equal to 4 for women vs. men was 6.8725, and the odds of women having Beighton greater equal to 4 was 9.0422 times higher than men. Patients in Group 2 had a younger age at onset of symptoms (P < 0.0001) and lower BMI (P < 0.0001), higher range of preoperative motion with hip flexion (P < 0.0001), abduction (P = 0.0117), internal rotation (P = 0.0464), external rotation (P = 0.0069), smaller labral tears (P < 0.0001), and a higher proportion underwent labral repair (P < 0.0001) and capsular repair (P < 0.0001) compared to Group 1.

**Conclusion:** There is a greater prevalence of generalized ligamentous laxity in the young female population. Orthopaedic surgeons treating these patients should have suspicion for capsular redundancy and soft tissue laxity as a source of pain.

## P04 Hip arthroscopy

### P04-258

#### OUTCOMES OF HIP ARTHROSCOPY WITH CONCOMITANT PERIACETABULAR OSTEOTOMY. MINIMUM FIVE-YEAR FOLLOW-UP

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**Introduction/objectives:** This study was conducted to report minimum five-year follow-up results of concomitant hip arthroscopy and periacetabular osteotomy (PAO) to treat acetabular dysplasia and intra-articular pathology.

**Methods:** Data were prospectively collected from October 2010 to June 2012. Patients were included in this study if they underwent concomitant hip arthroscopy and PAO with eligibility for minimum five-year follow-up. Follow-up was considered complete with documented modified Harris Hip Score (mHHS), Non-Arthritic Hip Score (NAHS), Hip Outcome Score-Sports Subscale (HOS-SS), abbreviated International Hip Outcome Tool (iHOT-12), pain on a 0-10 visual analog scale (VAS), and patient satisfaction on a 0-10 scale. Thirteen of fourteen eligible patients completed follow-up at a minimum of five years after surgery. There were ten females and three males. The average age of the patients was 21.9 years, and the average body mass index was 25.

**Results:** The mean lateral center-edge angle increased from 15.1 to 30.4 (P< .0001), and anterior center-edge angle increased from 11.3 to 28.9 (P< .0001). The Tonnis angle of acetabular inclination decreased from 18.9 to 4.9 (P< .0001). No arthritic changes were seen in preoperative radiographs, and there was no arthritic progression in radiographs taken at the latest clinical visit. All patient reported-outcomes scores demonstrated significant improvement in preoperative baseline to the minimum five-year follow-up scores (mHHS, P=.002; NAHS, P=.003; HOS-SS, P=.006). VAS decreased from a preoperative mean of 6.2 to 3.6 at latest follow-up (P=.004).

**Conclusion:** Concomitant hip arthroscopy and PAO appears to be a safe and effective procedure with favourable mid-term outcomes that are durable compared to the short-term.

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## P04 Hip arthroscopy

P04-337

ARTHROSCOPIC ASSISTED MINI-OPEN APPROACH OF THE HIP FOR THE TREATMENT OF BENIGN TUMOURS OF THE FEMORAL HEAD AND NECK - A CASE SERIES OF 6 PATIENTS

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**Case Study:** Bone tumours in general are very rare, benign in contrast to malign more often though. The femoral head and neck are frequent localizations for benign tumours and can lead to instability of the bone. Through the lateral approach there is a limited accessibility and exposure to ensure a complete curettage. In the present study we present a case series of 6 patients operated via arthroscopic assisted direct anterior mini-open approach.

6 patients were operated arthroscopic assisted direct anterior mini-open approach between 2013-2015. Two with bone instability due to fibrose dysplasia of the femoral neck (n=2), 4 subchondral chondroid tumours of the femoral head (2 atypic chondroid tumors and 2 chondroblastoma). All were diagnosed by imaging, 2 were additionally biopsied. After a direct anterior approach and a t-shaped capsulotomy a windowing of the femoral neck was performed. The curettage was performed arthroscopically assisted with a sharp curette and a high-speed burr. After that a biologic reconstruction was done. In the two cases of fibrotic dysplasia an additional osteosynthesis for stabilization of the bone was indicated. By distracting the leg in the 4 cases of chondroid tumours the integrity of the cartilage could be controlled by arthroscopy of the hip joint. Postoperatively the patients had 6 weeks of partial weight bearing with 10 kg. Follow up was done after 6 weeks, 12 weeks and 1 year.

Intraoperative all tumours could be reached by the described approach and a complete curettage without collateral damage could be carried out. In all 6 cases at 1 year follow-up a complete recovery of the bony situation could be observed. No tumour recurrence was observed. In none of the cases a revision surgery was necessary.

## P04 Hip arthroscopy

P04-339

RECONSTRUCTION OF THE ACETABULAR LABRUM WITH AUTOLOGOUS CAPSULE VIA ARTHROSCOPIC ASSISTED DIRECT ANTERIOR MINI OPEN APPROACH

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**Case Study:** Surgical treatment options for the hip have progressed significantly with the aim of maintaining and preserving the hip's anatomy, for example labral repair and the correction of FAI. The aim was to describe labral reconstruction using local capsular tissue via an arthroscopically assisted mini-open anterior approach as a method of restoring the integrity of the Labrum and present early clinical results.

4 patients (2 male, 2 female) (age 27 (range 22-34)) have been operated between 08/16-08/17. All 4 patients intraoperatively showed either a calcified Labrum or a labral defect due to prior surgery. In all 4 patients labral reconstruction using local capsular tissue via an arthroscopically assisted mini-open anterior was performed. Cartilage therapy (debridement and abrasion in 3 cases, 1 case microfracturing) and a correction of the head-neck junction restoring the alpha-angle

In all 4 patients labral reconstruction could be performed using a capsular stripe. The clinical results improved and at a mean follow-up time of 6 months, no revision surgery or a no specific postoperative complication was observed. The correction of the alpha-angle was significant from 76,3° (range 85-71) to 51,2° (49-54). The HOOS score improved significantly from 58,6 to 96,2.

Our technique of capsular augmentation allows good visualization of the defect and preparation of the acetabular rim. There is less donor site morbidity than with other techniques. Unlike other arthroscopic techniques using local capsular tissue, in our technique the capsule is closed and we observed no instability of the hip joint at 40° flexion and 10° external rotation.

This technique has not been tested biomechanically, and our good to excellent results are preliminary.

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## P04 Hip arthroscopy

P04-476

ADDITIONAL INTERVENTIONS REQUIRED FOLLOWING HIP ARTHROSCOPY

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**Introduction/objectives:** The adoption of arthroscopic hip surgery continues to increase. Satisfaction rates following surgery are high, but some patients will subsequently require further procedures or interventions for ongoing symptoms. At our institution, for patients who at follow-up either report or are noted to have stiffness and pain, a presumptive diagnosis of adhesive capsulitis is made, and a manipulation under anaesthetic (MUA) with injection is recommended. However, for pain without stiffness, an intra-articular injection alone is recommended, which is performed under local anaesthetic (for the presumptive diagnosis of pain due to chondropathy or synovitis without adhesions).

**Methods:** We analysed all cases performed between January 2012 and December 2016 by 2 specialist hip arthroscopy surgeons at a single NHS hospital, with a minimum of one year follow-up. Patient demographics, operative indication, procedure performed and any further procedure or intervention were recorded.

**Results:** 494 primary hip arthroscopies were performed in 285 females and 209 males, with an average age of 37yrs. Within 12 months of their arthroscopy, 73 (15%) underwent MUA with steroid injection, and 35 (7%) had injections performed under local anaesthetic. With a maximum of 5 years follow-up, 39 (8%) patients had undergone repeat arthroscopies, and 22 (4%) had a total hip arthroplasty.

**Conclusion:** Whilst conversion to arthroplasty is low, 22% require a further intervention within the first year following arthroscopy by high-volume surgeons with good rehabilitation support. We suggest that patients be advised of the common need for additional intervention within the first year after surgery.

## P04 Hip arthroscopy

P04-475

RETURN TO SPORT IN THE RECREATIONAL ATHLETE FOLLOWING HIP ARTHROSCOPY FOR FEMOROACETABULAR IMPINGEMENT

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**Introduction/objectives:** The adoption of hip arthroscopy for femoroacetabular impingement syndrome continues to increase, and yet the only published papers providing evidence from which to advise the recreational athlete regarding return to sport following surgery are based on professional athletes or a questionnaire study of surgeons. We set out to determine the length of time to return to sport, and the ability to perform their sport after at least 6 months follow-up in the recreational athlete.

**Methods:** We analysed all cases performed between June 2015 and May 2017 by 2 specialist hip arthroscopy surgeons at a single NHS hospital. Patient demographics, operative indication, and procedure performed were recorded. All patients received a booklet with a suggested rehabilitation protocol, plus weekly visits to a physiotherapist for the first six weeks were organised. Hydrotherapy was recommended from 3 weeks. We contacted all patients via postal questionnaire for their sport activities, return to sports timeframe and a HOS Sports scale, at a minimum of 6 months follow-up. The patients were then grouped, matched for age, sex, and BMI, according to their sport.

**Results:** The most common sports were Gym (15%), Cycling (11%), Swimming (11%), and Running (10%). Return to sport was achieved at an average of 5.4 months (Range 1-12, median 4.5), 3.9 (0-12, 3), 4.3 (1-12, 3), and 4.4 (3-9, 3) respectively. Average HOS Sports scales were 73.2, 78.5, 57, and 71.5 respectively.

**Conclusion:** Recreational athletes can be advised that they can expect to return to sport by 3 to 5 months according to their sport. Good outcome scores are achieved following hip arthroscopy. Whilst there is no significant difference, cyclists tend to return sooner and achieve a higher HOS Sports scale.

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## P04 Hip arthroscopy

### P04-592

CHONDROFILLER GEL USED IN HIP ARTHROSCOPIC FOR TREATMENT OF ARTICULAR CARTILAGE LESIONS : A COHORT STUDY WITH 6 TO 18-MONTH FOLLOW UP

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**Introduction/objectives:** ChondroFiller gel is an absorbable collagen implant which is intended to serve as a protective cover of the acetabular cartilage defect, allowing chondrocyte migration into the defect. The purpose of our study was to evaluate usage of ChondroFiller gel in the treatment of cartilage lesions in the hip joint during arthroscopy.

**Methods:** In the period 2015-2017, 26 hips were treated using ChondroFiller gel. The method was used in patients operated for acetabular cartilage lesions. The study group consisted of 5 females and 21 males. Hip Osteoarthritis was graded using the Tönnis classification. Hip function was assessed pre- and postoperatively using modified Harris Hip Score (mHHS). MRI was performed 6 months after surgery.

**Results:** Using the Tönnis classification, 11 hips were grade-0, 13 grade-1 and 2 grade-2. Preoperative mHHS ranged from 61 to 68 (average 63.7). Postoperative mHHS ranged from 68 to 100 (average 94). 20 results were classified as excellent, 4 as good and 2 as poor. Both poor results were observed in patients categorized preoperatively as Tönnis grade-2. Improvement of mHHS in Tönnis grade-0 and 1 patient was statistically significant ( $P < 0.0001$ ), but there was no significant improvement in patients with Tönnis grade-2 and both patients subsequently underwent total hip replacement. Excellent and good results in the mHHS correlated with signs of cartilage healing on MRI imaging.

**Conclusion:** Arthroscopic repair of articular cartilage damage using ChondroFiller gel is an effective technique in the treatment of early cartilage damage. We have seen encouraging mid-term results, although further longer term studies are warranted. Tönnis grade-2 or higher change on pre-operative radiographs is a contraindication to the use of the gel.

## P04 Hip arthroscopy

### P04-97

HIP DYSPLASIA AND ACETABULAR OVERCOVERAGE NEGATIVELY AFFECT LONGTERM OUTCOME AFTER OPEN SURGICAL TREATMENT FOR CAM FAI - A 15-YEAR FOLLOW-UP STUDY

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**Introduction/objectives:** Cam-type Femoroacetabular Impingement (FAI) has been described in 2003 and is a cause for hip pain and osteoarthritis of the hip. But long-term results for surgical treatment are rare. Therefore, we intend to determine The cumulative 10-year and 15-year survivorship (2) Predictive factors associated with the endpoints

**Methods:** We retrospectively evaluated 116 hips of 100 patients that underwent cam resection using a surgical hip dislocation between 1997 and 2000. Mean follow-up was 17 years (range 1-20) and the follow-up rate was 94%. Mean preoperative age was 32 years. Surgical hip dislocation and cam resection was performed without evaluation of pincer-FAI. To calculate the cumulative survivorship the Kaplan Meier method was used. The following endpoints were used: THA, subsequent FAI surgery, progression of OA and Merle d'Aubigné score less than 15 points. Cox regression model was used to calculate predictive factors for failure.

**Results:** (1)The cumulative 10-year and 15-year survivorship was 79% and 73% with the single endpoint THA. Using all endpoints, the cumulative 10-year and 15-year survivorship was 66% and 59%. At follow-up, 36 hips (31%) underwent conversion to THA. Preoperative hip dysplasia (LCE-angle < 22°), overcoverage (LCE-angle > 34°), female sex and preoperative age > 40 years resulted in a lower survivorship.

**Conclusion:** Preoperative hip dysplasia, acetabular overcoverage, female sex and preoperative age > 40 years negatively affect the long-term outcome after open treatment for cam FAI. Careful assessment of acetabular morphology is recommended before cam FAI surgery. Concomitant acetabular overcoverage should be treated with concomitant rim trimming. Cam FAI surgery should be performed with caution in the presence of hip dysplasia.

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## P04 Hip arthroscopy

### P04-251

ARTHROSCOPIC CAPSULAR PPLICATION IN PATIENTS WITH LABRAL TEARS AND BORDERLINE DYSPLASIA OF THE HIP: ANALYSIS OF RISK FACTORS FOR FAILURE

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**Introduction/objectives:** Borderline dysplastic patients with lower lateral center-edge angle (LCEA) and greater age may be at a higher risk of failure after arthroscopic capsular plication. The objective of this study is evaluate indications for arthroscopic capsular plication in patients with borderline hip dysplasia and to report on the potential risk factors for failure with this approach.

**Methods:** Data were retrospectively reviewed for all patients between 15 and 40 years of age who underwent hip arthroscopy. Inclusion criteria were an LCEA between 18-25, Tönnis grade less than 1, primary cases with capsular plication, and minimum two-year follow-up. Patients were excluded if they had any history of previous ipsilateral hip procedure, conditions, or diagnosis of osteoarthritis with Tönnis grade greater than 2. The "success" group consisted of all patients who achieved the patient acceptable symptomatic state (PASS) of modified Harris Hip Score (mHHS) greater than 74 and had no ipsilateral hip surgeries subsequent to their index arthroscopy. The "failure" group was patients who were below the PASS at latest follow-up, required secondary arthroscopy, or conversion to total hip arthroplasty (THA).

**Results:** Risk factor analysis revealed that the "failure" group were older than the "success" group ( $p = 0.005$ ). LCEA did not differ between the groups and no other risk factors for failure were identified.

**Conclusion:** Stringent criteria for patient selection and meticulous repair or augmentation of the static stabilizers of the hip yielded favourable clinical outcomes in this study cohort with borderline dysplasia. Increased age was the main risk factor for failure in the management of borderline hip dysplasia with isolated arthroscopic hip surgery with capsular plication.

## P04 Hip arthroscopy

### P04-256

PRIMARY HIP ARTHROSCOPY WITH LABRAL RECONSTRUCTION: IS THERE A DIFFERENCE BETWEEN AUTOGRAFT AND ALLOGRAFT?

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**Introduction/objectives:** Labral reconstruction has been described as a solution for the irreparable labrum. Initial techniques employed autografts, while more recent procedures have utilized allografts. The purpose is to compare patient-reported outcome scores (PROs) and the survivorship rate between two groups of patients who underwent primary labral reconstruction with hamstring tendon grafts, one group with allograft and the second group with autograft.

**Methods:** Data was reviewed from September 2010 to March 2015. Inclusion criteria were as follows: primary hip arthroscopy with labral reconstruction, with either a hamstring autograft or allograft, minimum two-year postoperative measures for the modified Harris Hip Score (mHHS), Non-Arthritic Hip Score, Hip Outcome Score-Sports Specific Subscale, and Visual Analogue Scale (VAS). Exclusion criteria were previous ipsilateral hip surgery, previous hip conditions, preoperative Tönnis osteoarthritis grade > 1, and Worker's Compensation claims.

**Results:** 29 patients (29 hips) were included: 17 allograft patients (17 hips) and 12 autograft patients (12 hips). All included patients had an 85.3% follow-up rate. All PROs and VAS demonstrated significant improvements at latest follow-up except for mHHS for the autograft group ( $p = 0.064$ ). The allograft group was found to have a significantly higher mean patient satisfaction score than the autograft group.

**Conclusion:** Primary arthroscopic hip labral reconstruction yielded improvements in PROs and patient satisfaction. There were no differences in clinical outcomes between hamstring allograft versus autograft. Hamstring allograft and autograft may be considered comparable graft choices for primary reconstruction.

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## P04 Hip arthroscopy

### P04-246

#### ENDOSCOPIC TREATMENT OF DEEP GLUTEAL SYNDROME: SURGICAL TECHNIQUE AND RESULTS

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**Introduction/objectives:** Deep gluteal syndrome (DGS) is an entity characterized by pain or paresthesias on the buttock, hip or posterior thigh caused by a non-discogenic, extra-pelvic compression of the sciatic nerve. This compression can have multiple etiologies and is often a difficult and neglected diagnosis. An endoscopic approach allows for direct visualization and decompression of the sciatic nerve in the deep gluteal space, with minimal morbidity. We present our results with this technique, technical key points, clinical anatomy, causes for compression and patients results.

**Methods:** We conducted a retrospective, transversal study, collecting data from patients between January 2013 and December 2016. All patients presented posterior hip pain, thigh paresthesias and difficulty to remain in a seated position. Lumbar MRI excluded discogenic pain. A minimal 3m conservative periods was trialed. AVS, WOMAC, and subjective satisfaction scales were used. Endoscopic technique was done in lateral decubitus, with sciatic nerve decompression from the sciatic foramen to ischial tuberosity, followed by piriformis tenotomy.

**Results:** The study included 23 patients, 16 female, 7 male, with a mean age of 41.2y (24 - 67y). Mean duration of symptoms was 2.9y (6m - 8y). Follow up was from 3m up to 28m. Mean AVS improved from 7.4 (6 - 10) to 2.7 (0 - 6). Mean WOMAC improved from 56.4 (47.3 - 77.8) to 84.8 (56.3 - 100). Subjectively, 11 patients were very satisfied, 8 satisfied, 4 indifferent.

**Conclusion:** DGS is an unusual, undiagnosed and neglected pathology. Clinical suspicion is crucial for a correct diagnosis. If conservative treatment fails, and endoscopic procedure, with sciatic decompression and piriformis tenotomy is an effective technique with little to no morbidity associated.

## P04 Hip arthroscopy

### P04-328

#### INTRACAPSULAR TUMORS OF THE HIP: AN ARTHROSCOPIC APPROACH

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**Introduction/objectives:** Intracapsular benign tumors of the hip are a particularly rare entity. Due to the complex hip anatomy and approaches, an open procedure is usually associated with some sequelae. To overcome this, hip arthroscopy as evolved and has shown great promise as a valid technique, with at least the same results as an open procedure, without its morbidity. This work aims to show the feasibility, surgical technique and key points in the approach and treatment of these tumors by hip arthroscopy.

**Methods:** A retrospective, transverse study was conducted regarding hip arthroscopy for the treatment of patients with a diagnosed intracapsular benign tumor between January 2014 and December 2017. All patients were treated by the same surgeon and were submitted to VAS, WOMAC and subjective satisfaction scores. Hip arthroscopy was conducted by a transcapsular approach in dorsal decubitus and a traction table.

**Results:** Five patients were included in this study: 3 female and 2 male, with a mean age of 33y (19 - 57y). Mean time of symptoms was 1.5y (2m - 7y). Three cases were diagnosed with an osteochondroma, one case with an enchondroma and the last one with a villonodular synovitis. VAS improved from a mean 6.9 (6 - 10) to 0.7 (0 - 2), and WOMAC score from a mean 46.4 (37.3 - 81.8) to 84.8 (76.3 - 100). Subjectively, 3 patients were very satisfied, 2 satisfied.

**Conclusion:** Hip arthroscopy is a valid alternative to the classic open procedures, allowing the surgical resection of the intracapsular tumors and treatment of concomitant hip pathology, while being minimally invasive, and thus providing less morbidity and greater patient satisfaction.

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## P04 Hip arthroscopy

### P04-392

#### ARTHROSCOPIC TREATMENT OF HIP INTRA ARTICULAR OSTEOID OSTEOMA

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**Introduction/objectives:** Historically the golden standard treatment for acetabular Osteoid Osteoma has been curettage by open surgery. Lately CT guided radiofrequency ablations has gain more and more popularity but this is associated to soft tissue complications and to chondral damage when the lesion is located close to the cartilage layer. There are a number of cases in which due to failure of the previous treatment or to the localization of the lesion, an arthroscopic treatment may be useful and successful.

**Methods:** We describe a series of cases treated arthroscopically. Lesion localization was mostly on the femur side. All patients had a complete preoperative clinical evaluation including MHHS and NAHS and X-Rays, and MRI or CT scan were performed. In all cases we performed a central compartment first technique with antero lateral and mid-anterior portals.

**Results:** The lesions were detected through direct vision and fluoroscopic assistance and were removed using arthroscopic curette, shaver and radiofrequency. The possibility of using flexible radiofrequency devices is very helpful especially in the acetabular side and allows to reach the lesion and to cauterize the deep portion of it. Associated lesions were detected in 20% of the cases. All patients had an immediate post-operative pain relief and a complete recovery in 2 months' time. Patients with associated lesions had a complete recovery in 5 months' time.

**Conclusion:** Hip arthroscopy may be a valid tool to treat intra articular osteoid osteoma reducing complications due to open surgery or to CT guided radiofrequency treatments. Hip arthroscopy can also allow to treat associated lesions such as labrum tears, femoroacetabular impingement or chondral damage.

## P04 Hip arthroscopy

### P04-17

#### RETURN-TO-WORK AFTER ARTHROSCOPIC SURGERY FOR FEMORAL ACETABULAR IMPINGEMENT IN PATIENTS YOUNGER THAN 30 YEARS

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**Introduction/objectives:** The return-to-sport after FAI surgery had been discussed most frequently. However, since most of the patients who had undergone FAI surgery are younger, the socioeconomic perspective is becoming increasingly important. The aim of this work was to analyze the return-to-work after arthroscopic FAI surgery in patients younger than 30 years.

**Methods:** 43 patients (between 18 and 30 years) who had undergone arthroscopic FAI surgery during April 2014 to April 2015 were analyzed prospectively. We divided our patients in 3 groups depending on their workloads (sitting-, standing- and work with physical activity) and measured the time to return-to-work. After a follow-up of 20.4 months (14-28 months) the HOOS and WOMAC score were also collected.

**Results:** All patients achieved 100% workability. In the comparison of the groups, the average time of return-to-work was 4.8 weeks for sitting-, 7.9 weeks for standing-, and 24.3 weeks for physical activity. There was a significant difference between the groups (p=0.04). The groups did not differ in age, body size, body weight and BMI.

Furthermore pre- and postoperatively achieved PROs per group were compared. In the seated group, all scores showed a highly significant improvement. Significant improvements were also seen in the standing group, but the WOMACstiffness showed no significant improvement (p=0.067). For the physically working group, a significant difference could be found only for HOOSsymptoms (p=0.033), HOOSADL (p=0.024), WOMACfunction (p=0.024) and WOMACtotal (p=0.03).

**Conclusion:** All patients achieved 100% workability. The time of return-to-work was dependent on the physical demand of the job, sitting workers returned fastest. The postop. achieved changes in the PROs also depended on the workload.

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## P05 Hip preserving surgery

### P05-62

HIP PRESERVATION SURGERY FOR FEMORO-ACETABULAR IMPINGEMENT IN PATIENTS WITH OSTEO-NECROSIS OF FEMORAL HEAD

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**Introduction/objectives:** To describe femoro-acetabular impingement (FAI) in patients with avascular necrosis of femoral head. To study outcomes of hip preservation surgery in these patients.

**Methods:** We studied 15 patients with FAI secondary to osteonecrosis of femoral head. This entity has not been described before. Partial collapse of femoral head occurs, particularly in the antero-superior part of femoral head, secondary to osteonecrosis. With subsequent remodelling, periphery of the femoral head flattens with formation of osteophytes. All these patients were managed with open/arthroscopic osteochondroplasty. These patients had symptoms of impingement. Joint space was well maintained on radiographs and magnetic resonance imaging (MRI). Cam deformity was studied on computed tomography and MRI. In 6 patients open osteochondroplasty was done using surgical hip dislocation. In 9 patients arthroscopic femoral head osteochondroplasty was done. Patients were followed prospectively for hip pain (VAS), Harris hip score(HHS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and hip range of motion. Statistical analysis was performed using Students t-test.

**Results:** Statistically significant improvement in the VAS for pain, HHS and WOMAC score and hip range of motion was noted. Mean HHS improved from 71.3 (SD, 13) to 89.7 (SD, 14.5), p-value 0.0079. Mean WOMAC improved from 73.6 (SD, 15.4) to 92.4 (SD, 16), p-value 0.0154. Impingement test became negative in all the patients. There was no conversion to total hip arthroplasty at the mean follow-up of 2 years. All patients could sit on the floor cross-legged and squat.

**Conclusion:** Hip preservation surgery leads to good outcomes in carefully selected patients with osteonecrosis and partial collapse of femoral head.

## P05 Hip preserving surgery

### P05-131

HIP OSTEO-NECROSIS - A CASE OF SPONTANEOUS RESOLUTION

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**Introduction/objectives:** Avascular Necrosis (AVN) of the femoral head is a well-known entity but its etiology and treatment remains subject of much discussion. Our objective was to report and analyse a clinical case of bilateral hip osteonecrosis (Ficat III and IV) in a patient with lupus on steroids with spontaneous resolution with a follow up of 8 years.

**Methods:** A 31 year old female complained of bilateral groin pain worse on the right side, without trauma. History of systemic lupus erythematosus with chronic steroid treatment. On examination, she had mild bilateral groin pain when walking accentuated with hip mobilization. Magnetic resonance revealed bilateral AVN Ficat IV on the right and Ficat III on the left. Subjected to right cementless total hip arthroplasty. Two years later a new MRI showed excellent evolution on the left side compared to the previous MRI.

**Results:** No complication after surgery on the right side with a Harris Hip Score of 95. No complains on the left side after a follow up of 8 years.

**Conclusion:** Atraumatic AVN of the hip is typically associated with exogenous glucocorticoid treatment. Spontaneous resolution of osteonecrosis of the femoral head can occur. The factors revealed in the literature that appear to be related to resolution are early, asymptomatic disease and small lesion size. This patient had a symptomatic necrosis with a Ficat III on the left hip that spontaneously got better clinically and radiologically. Large scale prospective studies are required to study the MRI after taking corticosteroids and to investigate the relationship between the progression of the disease and the possibility of its spontaneous resolution.

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## P05 Hip preserving surgery

### P05-401

SUBTROCHANTERIC SHORTENING OSTEOTOMY IS POSSIBLE THROUGH DIRECT ANTERIOR APPROACH

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**Introduction/objectives:** One of the most challenging issues in performing Total Hip Arthroplasty (THA) in crowe type 4 developmental hip dysplasia (DDH) is how to transfer such a high ridged centre of hip rotation to an anatomic position. Subtrochanteric femoral shortening through posterior or lateral approach is the technique of choice for this problem. In this abstract we described our stepwise method in subtrochanteric femoral shortening technique through direct anterior approach

**Methods:** between January 2015 to January 2018 we performed 18 types 4 DDH in 16 patients (2 bilateral) through direct anterior approach including transverse subtrochanteric femoral shortening. We have introduced our stepwise procedure for such a shortening osteotomy through direct anterior approach. Patients were followed at 1st, 4th, 12th weeks, control radiograph were done at 4th and 12th weeks

**Results:** 15 out of 18 of osteotomy site united at 12th week follow up, 2 osteotomy sites united at 6 months and 1 patient experienced nonunion but ignored another surgery of course she had mild pain at nonunion site. We had 3 dislocations during admission that 2 of them underwent close reduction and they continue with stable joint but 1 out of 3 experienced recurrent dislocation because of poor restoration of medial offset that had revised. We had no infection, no DVT/Steno wound complication

**Conclusion:** With this stepwise procedure for proximal subtrochanteric femoral shortening, one who is experienced in direct anterior THA in difficult primary cases, can benefit from several advantages including operation will done in supine position and length control (after shortening osteotomy) easily can be done, posterior soft tissue almost remain intact and with properly oriented components guarantee posterior stability

## P05 Hip preserving surgery

### P05-154

CERCALGE WIRE FIXATION OF TROCHANTERIC OSTEOTOMIES IN HIP REPLACEMENTS, OUR EXPERIENCE AND COMPARISON WITH PLATE/STAPLE-FIXATION.

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**Introduction/objectives:** The aim of our study was to compare clinical and radiological results of a greater trochanter osteotomy that has been fixed using cerclages with the ones fixed with plates/staples as well as to describe the technique of the combined double supratrochanteric cerclage.

**Methods:** A retrospective study was performed at Hospital Clinico San Carlos in Madrid between 2002 and 2017 including 51 trochanteric osteotomies of hip replacement surgeries with and at least 1 year of follow-up, 23 were fixed with cerclage and 28 with a Dall-Miles® (Stryker) staple or Cable-Ready plate® (Zimmer). We evaluated radiological (consolidation, osteolysis adjacent to the fixation materials and migration of the greater trochanter) and clinical (pain in the greater trochanteric area and Trendelenburg gait) results. Statistical analysis was performed with SPSSv15 using the Chi-square test and Mann-Whitney.

**Results:** 25,0% of the plates/staples group did not obtain consolidation compared to 21,7% of the cerclages (p=0,785) and osteolysis was detected in 32,1% vs 8,7% (p=0,084). Trendelenburg gait was detected in 35,71% of the plates/staples vs 13,04% of the cerclages (p=0,054). 14,2% of plates/staples had to be removed due to pain vs 0% of cerclages (p<0,05). Mean follow-up was 44,4 months (range 12-175).

**Conclusion:** In our serie, the fixation of a greater trochanter osteotomy with cerclages improves the clinical and radiological results, however a greater number of patients would be necessary in order to confirm these results.

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## P05 Hip preserving surgery

### P05-397

RETURN TO SPORTS AND ACTIVITY TOLERANCE AFTER PERIACETABULAR OSTEOTOMY  
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**Case Study:** Background: Periacetabular osteotomy (PAO) described by Ganz et al. (1988), is worldwide recognized surgical procedure to treat symptomatic DDH. Many patients complain hip pain and instability, which can limit participation in sports. Data regarding return to athletic activity or sports participation after this procedure are still limited. Objectives: determine clinical and functional outcomes by means of the use of this technique in young athlete.

**Study Design & Methods:** institutional database identified 43 sport players treated with PAO in the period of time from 2007 to 2016. In all patients minimal invasive inguino-transartorial approach was performed. Center Edge angle (CE), Acetabular Index (AI) in frontal and faux profile views were measured. UCLA score was used to measure physical activity, whereas pain, range of motion and function was measured WOMAC and NAHS. These records were obtained preoperatively, yearly and at the latest follow-up. Wilcoxon test was used for statistical analysis (SPSS 13). A p<0,05 value was considered to be statistically significant.

**Results:** This study included 43 patients (43Hips; 19 males and 24 females), mean age of 23 years (CI95% 19.47-26.69). Average follow-up was 52.45 months (CI95% 51.93-52.97). CE angle had a mean of 18.23° preop, and 35.72° postop, (p<0,001). AI angle had a mean of 17.97° preop, and 5.4° postop, (p<0,001). WOMAC and NAHS scores improved from mean value of 86.77 to 96.48 for WOMAC and from 79.15 to 94.56 for NAHS. UCLA score was unchanged (9.4 to 8.9 p=0.345).

**Conclusions:** Improvement in clinical and functional outcomes can be expected after PAO, athletes were able to return to prep activities.

## P05 Hip preserving surgery

### P05-60

HIP PRESERVING SURGERY FOR FEMORAL HEAD AVASCULAR NECROSIS  
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**Introduction/objectives:** Femoral head avascular necrosis (FHAV) is a progressive disease, usually occurring between 3rd and 5th decades of life and, without treatment, elicits hip joint destruction. Decompression of the head is associated with a decrease in intraosseous pressure, which is thought to improve blood supply to the head and to delay the progression of the disease.

**Methods:** We performed a retrospective analysis of three patients (four hips) with FHAN treated with the "Advanced Core Decompression System". The outcomes were obtained using Harris Hip Score (HHS).

**Results:** The patients had a mean age of 48 years (35-56). They were submitted to core decompression and the osseous defect was filled with graft substitute. Patient 1 improved from a HHS of 58 to 96, which maintains 8 years after surgery. In patient 2 the symptoms remained after surgery and she was submitted to total hip arthroplasty. Patient 3 was submitted to the procedure bilaterally and improved from a HHS of 61 to 99 bilaterally (3 years of follow-up).

**Conclusion:** The outcomes of our study are in agreement with the literature, with a high rate of pain resolution and possibly even regression of head necrosis process. Although in our series the procedure was not effective in one patient, we analyzed the femoral head after osteotomy and found an inadequate curettage of the necrotic area with a small subchondral area still having a necrotic focus and not filled with graft, which we thought contributed to progression of the disease.

The system used in this procedure has an easy-to-perform surgical technique, with a low complication rate. Although we present promising results, a greater number of patients and a longer time of follow-up are necessary to be able to conclude on the effectiveness of their use.

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## P05 Hip preserving surgery

### P05-47

HIP PRESERVATION SURGERY IN CONDITIONS OF DEVELOPED DYSPLASTIC COXARTHROSIS  
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**Case Study:** Introduction: The significance of pelvic and femoral osteotomies in the condition of developed arthrosis is still disputable. Early osteoarthritis and dis-congruency of the articular surfaces are evaluated by many specialists as contra-indication for the joint preserving operation. Purpose: Review middle term results of reconstructive treatment in adolescents and young adults with dysplastic coxarthrosis

**Materials and methods:** Treatment outcomes of 26 patients with dysplastic coxarthrosis were analyzed. Mean age at intervention was 16 years (14-32). The grade of arthrosis in joints were assessed according to Tonnis: I - 13, II - 10, III - 3. The type of congruence of articular surfaces were assessed according to Coleman: III - 11, IV - 15. All subjects underwent extraarticular hip reconstruction with the Ilizarov apparatus.

**Results:** Outcomes were followed from 5 to 12 years. Functional outcomes according to Merle d'Aubigne-Postel were: Pain 4,7±0,1 points. ROM - 4,1±0,2 points. Walking ability - 4,6±0,1 points. Radiographic findings according to Severin were: IIa - 14, IIb - 8, III - 4; according to Coleman: I type - 3, II type - 2, III type - 8, IV type - 4. The grade of arthrosis was unchanged in 20 cases, progressed one grade in 2 joints, reduced in 4 cases.

**Conclusions:** application of reconstructive operations with Ilizarov frame allows to extend fairly the indications for extra-articular reconstructive invasions in dysplastic coxarthrosis. Improved congruence of the articular surfaces in conditions of osteoarthritis in most cases leads to a slowing of progression.

## P05 Hip preserving surgery

### P05-224

GRADUAL REDUCTION OF LATE-DIAGNOSED DEVELOPMENTAL DYSPLASIA OF THE HIP USING ULTRASOUND-GUIDED FLEXION AND ABDUCTION CONTINUOUS TRACTION  
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**Introduction/objectives:** Previously, excellent results of gradual reduction of developmental dysplasia of the hip (DDH) using ultrasound-guided flexion and abduction continuous traction (FACT-R) were reported in patients younger than 12 months of age. The reduction rate was 99.0% and the rate of avascular necrosis was 1.0%. The purpose of this study is to report the outcome of FACT-R in patients 12 months or older.

**Methods:** We reviewed retrospectively 35 hips with DDH that were referred to our Ehospital between 1995 and 2007 and were reduced by FACT-R at 12 months or older. In addition to the original protocol of FACT-R, bone traction and tenotomy of adductor with or without iliopsoas were regularly performed. Among these, we included 30 hips in 27 patients who were followed over 8 years old. Severin classification system was used for the assessment of radiographic outcome at the final follow-up. Level of evidence-Level IV.

**Results:** The mean age of the initiation of FACT-R was 2.0 years old (1.1-3.7), and the mean follow-up period was 10.7 years (7.7-14.8). All hips were successfully reduced by FACT-R and no additional closed or open reduction was performed. The mean total period of traction to achieve reduction was 43.0 days (17-108). No avascular necrosis was observed. Secondary surgery for residual hip dysplasia was performed in 25 hips (83%) at the mean age of 5.1 years old (3.4-6.4). At the final follow-up, radiographs of 29 hips (97%) were categorized as Severin class I or II.

**Conclusion:** FACT-R is an effective and safe treatment for late-diagnosed DDH. Further study is required to determine the need for bone traction and tenotomy.

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## P06 Infection

### P06-235

#### THE PATIENT SPECIFIC HIP SPACER IN 2-STAGE REVISIONS

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**Introduction/objectives:** The use of an antibiotic cement spacer is a frequent used tool in two-stage revision of a PJI. Often pre-fabricated spacers or spacer moulds are used, in standard sizes. As an alternative seen spacers are adjusted with bone cement by hand, or formed completely by hand to fit the patient's needs. Frequently seen spacer complication as breakage or luxation may be due to suboptimal sizing in relation to the patients unique anatomy. Also loss of bonestock due to extra resection or inadequate dead space filling is a thing of concern. A patient specific bone cement spacer, mimicking the extracted prosthetic implant, may reduce this problem. The aim was to create a 3D printed mould which can be used intraoperatively for the spacer production.

**Methods:** A 3D model of the desired spacer was made using segmenting and 3D graphics software, based on a CT scan. Then a mould was generated, 3D printed in biocompatible and ISO certified polyamide and sterilized afterwards. In the OR a backbone of Steinmann's pin was formed, placed in the mould and this was filled with bone cement. After hardening and removal of the mould, the spacer was implanted in the patient after removing the primary implant and extensive debridement.

**Results:** The mould produced a spacer matching the planned dimensions. Implantation gave a stable result, good dead space filling, while mimicking the previous anatomy. With 3D software at our disposal, the costs of a mould lies around the E100,-, which is lower than commercially available spacers.

**Conclusion:** The use of a 3D printed mould is a useful and cost effective technique in creating a patient specific hip spacer as part of the 2-stage revisions in PJI treatment, possibly reducing the incidence of spacer complication or loss of bonestock.

## P06 Infection

### P06-214

#### OBESITY INCREASES RISK OF INFECTION IN REVISION TOTAL HIP ARTHROPLASTY

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**Introduction/objectives:** The aim of this study is to evaluate if obesity negatively affects: (1) complication rate, (2) reoperation and revision rate and (3) functional outcome (based on patient reported outcome measures, PROMs) in revision total hip arthroplasty (rTHA). To our knowledge this is the only recent study to prospectively review these three aspects in what might be considered challenging rTHA.

**Methods:** 444 rTHAs (cup, stem, both, n= 265, 57, 122 respectively), performed in a specialized high-volume orthopaedic center from 2013 to 2015, were prospectively followed. Complications and Oxford Hip Score (OHS) were administered at 4 months, 1 year and 2 years. Thirty-four patients had a BMI >35 kg/m2 (obese), of which thirteen patients with a BMI >40 kg/m2 (morbidly obese).

**Results:** Infection following rTHA was more common in obese patients (8/34: 24%) and in morbidly obese patients (5/13: 38%) than in non-obese patients (15/410: 4%; p's < .001). No differences between obese and non-obese groups for other complications were observed (aseptic loosening, dislocation, periprosthetic fractures, thromboembolic events). There were no significant differences in reoperation and revision rates overall (p's > .06) and due to infection (p's > .46) for obese and non-obese patients. Scores on the OHS improved from 42 ±13 at baseline to 27±12 at 1 and 2 year follow-up (p<.001). Obese patients had overall poorer OHS scores than non-obese patients (p<.001), but improvement of OHS did not differ between obese and non-obese patients (p = .20).

**Conclusion:** Obesity is associated with an increased risk of infection following revision THA. Patients with high BMI should be counselled appropriately before surgery.

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## P06 Infection

### P06-551

#### PREVENTION OF PJI USING 6 STEP INEXPENSIVE "BIOFILM PREVENTION PROTOCOL"

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**Introduction/objectives:** Infection is a devastating complication in both trauma and elective orthopaedic surgery. The bacterial contamination of instruments and implants often occurs during the actual surgical procedure. Over the last decades surgeons have lost the tradition and discipline of the preantibiotic Era where implants and surgical wounds were never touched by the surgical team.

**Objective**  
To investigate the effectiveness of a "Biofilm Prevention Protocol" in elective arthroplasty. This Biofilm Prevention protocol involves 6 intraoperative surgical steps

- Change of gloves by the whole surgical team before implantation of any implant
- Not touching implants by hand
- Rifampicine covering of nails and screws
- Extensive 2-4 litres Pulsatile lavage for all procedures
- Gentamycine swab covering of cementless femoral stems before closure
- Meticulous watertight wound closure

**Methods:** In the period between 2003 and 2014 a single hip and knee surgeon treated 2290 patients.

**Results:** In the THA-group 5 patients (0,335%) had a readmissions related to an infectious cause, 3 had a SSI (surgical site infection), 2 had a deep infection. In the TKA-group there also were 5 patients (0,625%) with an infection related readmission in the first year after index surgery, 2 had a SSI and 3 had a deep infection.

**Conclusion:** A simple 6 step "biofilm Prevention Protocol" shows a low readmission rate for infection in both hip fracture and elective hip surgery. Further investigation on a larger scale is mandatory to evaluate if this improvement in intraoperative surgical discipline lowers the postoperative infection rate

## P06 Infection

### P06-546

#### SAFE INTERVAL IN TWO-STAGE EXCHANGE FOR PJI USING A CONSTRAINED ARTICULATING SPACER

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**Introduction/objectives:** The management of the interval in 2-stage exchange for PJI can have a profound effect on obtaining a successful outcome. The use of spacers is commonplace that have a structural, functional & therapeutic role. Problems with spacers are frequent and dislocation is a concern for articulating spacers. Our aim is to present experience of using a constrained acetabular socket as an articulating spacer in 2-stage exchange.

**Methods:** Consecutive case series where all patients received a constrained articulating spacer. At 1st stage following removal of all foreign material & debridement an articulating spacer was inserted using an all poly constrained acetabular cup with cement & high dose antibiotics determined by multi-disciplinary management.

**Results:** 38 cases in patients with a mean age of 67.3 years (38-84) & a mean interval of 160 days (7 - 693). Two patients failed to progress to 2nd stage (1 excision arthroplasty & 1 patient died). A total of 3 adverse events occurred during the interval all on the femoral side (1 peri-prosthetic fracture, 1 stem fracture and 1 spacer subsidence). Two of these events adversely affected planned interval and changed timing of surgery. Overall complication rate in the interval 7.8% and overall results of eradication of infection 93.7% (95% CI 79.8-98.2).

**Conclusion:** The use of a constrained cemented liner in our series completely avoided dislocation and overall had a low complication rate. The mean interval duration in our series approached 5 months as our routine practice is optimise patient factors in this period (e.g. improve diabetes control) that may delay re-implantation. We therefore believe that a constrained liner presents both a safe and indeed durable option to attain a safe interval during a 2-stage exchange.

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## P06 Infection

### P06-194

SAFETY OF TOPICAL USE OF TRANEXAMIC ACID AND VANCOMYCIN IN TOTAL HIP ARTHROPLASTY.  
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**Introduction/objectives:** The purpose of this study was to retrospectively assess the safety of simultaneously topical use of tranexamic acid and vancomycin powder in total hip arthroplasty.

**Methods:** From 2014 to 2016, 209 consecutive total hip arthroplasties including 85 with neither tranexamic acid or vancomycin, 59 with tranexamic acid, and 65 with tranexamic acid and vancomycin were performed in a tertiary center.

**Results:** There were no differences between the three groups of total hip arthroplasties before the operation (preoperative hematocrit, preoperative platelets, BMI, age, use of anticoagulants). Hematocrit, hemoglobin and platelets dropped significantly from preoperatively to postoperatively (first and third day) (Tukey HSD test <0.05) in all groups. However, the decrease of the hematocrit in the no treatment group (-10%) was greater than the other two treatment groups (-7.3% and -7.5%) (Tukey HSD test <0.05). Hemoglobin also decreased more in the no treatment group (-2.8 gr/dl) compared to the other treatment groups (-2.5 gr/dl and -2.4 gr/dl) (Tukey HSD test <0.05). There was no difference in the complications between the three groups (infection, thrombotic events)

**Conclusion:** The topical use of tranexamic acid and vancomycin powder in total joint arthroplasty did not alter the antifibrolytic effect of the former.

## P06 Infection

### P06-169

RISK FACTORS FOR FAILURE OF TWO-STAGE REVISION IN THA INFECTIONS: A SINGLE CENTRE COHORT ANALYSIS  
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**Case Study:** Objective: The aim of this study is to evaluate which factors are able to determine the failure of the two-stage revision surgery in prosthetic hip infection (PJI).

**Materials and methods:** 21 hip PJI 2-stage revision surgery were retrospectively enrolled. The diagnosis has been made using the criteria established by the Musculoskeletal Infection Society (MSIS) and readapted by the Philadelphia Consensus Conference group. The patients underwent periodic clinical radiographic and laboratory controls after the surgical procedure. The two-stage revision treatment was considered unsuccessful in case of re-infection or in case of severe complications occurring within one year from the treatment initiation. Student's t test and the chi-square test were chosen to study continuous and categorical variables.

**Results:** The mean follow-up was 23,8 months (Min:12-Max 48). 57% healed without any complication. The reinfection rate was 19% and after a third stage the final failure rate was 9.5%. The study has shown with statistical significance that a greater number of previously surgical procedures ( $p < 0.05$ , OR=22) and BMI>25 ( $p < 0.05$ , OR=4) are risk factors in predicting the failure of two-stage revision surgery. A shorter lapse (<60 days) between 1st and 2nd stage was recorded in the failure cases.

**Conclusion:** Knowing the factors responsible for increasing of failure of two-stage revision could lead to closer monitoring and more aggressive management in those patients expected to be at greater risk of reinfection, helping the surgeon in decision making. Obesity, multiple surgeries and a short time lapse between 1st and 2nd stage are risk factors for failure. The patients should be adequately informed of their own risk of failure.

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## P06 Infection

### P06-179

DAPTOMYCIN FOR THE TREATMENT OF PATIENTS WITH PERIPROSTHETIC HIP INFECTION  
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**Introduction/objectives:** The aim of this study was to evaluate the effectiveness and safety of Daptomycin (DAP) for periprosthetic hip infection.

**Methods:** Between August 2014 and December 2016, 21 patients were administered DAP for the treatment of periprosthetic hip infection at our institution. We conducted a retrospective study of all 21 patients, who were followed for a mean of 21 months (6-36 months). They included 18 women and 3 men, with a mean age of 71 years (36-88 years). The previous operations were total hip arthroplasty in 17 patients, hemiarthroplasty in 3, open reduction and internal fixation in 1. The mean duration of DAP therapy was 27 days, at a mean daily dose of 5.4 mg/kg. Surgical options used with DAP therapy included no operation in 7 patients, only debridement in 4, one-staged revision in 6, and two-staged revision in 4. The risk of recurrent infection was evaluated using the scoring system described in our previous report, based on six parameters: 1) general condition, 2) duration of infection, 3) wound complications, 4) presence of microorganisms, 5) C-reactive protein, and 6) necessity for bone grafting. Each parameter was rated from 0 to 2 points, giving a maximum score of 12 points (low-risk).

**Results:** Isolated microorganisms were Gram-positive pathogens in 11 patients, and no complications occurred. In Gram-positive pathogens, infection control rates in patients with and without implant removal were 80% and 67%, respectively. Of success cases, mean risk scores in patients with and without implant removal were  $6.3 \pm 2.2$  points and  $7.0 \pm 3.2$  points, respectively.

**Conclusion:** DAP was effective and safe for treating patients with refractory periprosthetic hip infection. Furthermore, patients with low-risk might not require implant removal.

## P06 Infection

### P06-92

QUALITY OF LIFE AND FUNCTION OF RETAINED FUNCTIONAL HIP SPACERS  
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**Introduction/objectives:** Information of quality of life and function of retained spacers over time has not been established until now. The aim is to evaluate the quality of life, function and mental health of a series of patients treated with cemented articulated functional spacers

**Methods:** 15 patients with functional spacers with a minimum 3 years follow-up. Group A: 19 patients with standard protocol of 2 stage as control group B. The main reason for retaining of spacers over time was the patient rejection to a second surgical procedure. Quality of life, function, and mental health of both groups were prospectively recorded at 3, 6, 12, 18 months and each year until the end of follow-up using the WOMAC and the physical and mental health scales of the SF-36.

**Results:** Group A: 5 re-revisions (33.3%), 3 dislocations; 2 periprosthetic fractures; 1 persistent infection. Group B: 2 re-revision, (10.5%) 1 persistent infection, 1 dislocation.  
Mean WOMAC score until the year A 81.3 (ic95% = 3.6) vs B 85.3 (3.3)  $p = 0.15$ .  
SF 36, physical health, A 63.4 (ic95% = 14.7) vs 77.7 (ic95% = 5) of B,  $P$  less than 0.01. Mental health was 69.3 (14.3) for A vs 88.5 (3.2) for B,  $P$  less than 0.01  
At 18 months, A was associated to a lower WOMAC and SF-36 scores, WOMAC: A= 78.6 (ic 95% = 4.6), vs B= 84.7 (6.7),  $p = 0.22$   
SF 36: physical health: group A= 64.1 (ic95% = 11.7) vs B= 75.4 (ic95% = 4),  $P$  less than 0.01. Mental health, A= 57.1 (11.7) vs. B= 87.8 (5.2)  $P$  less than 0.01  
At 3 years, group A had significantly lower scores in all scales.

**Conclusion:** This study showed satisfactory infection control in the functional spacer group, the retention further than 18 months has been related not only to the decrease of the quality of life and function but a deterioration of the cognitive faculties.

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## P06 Infection

### P06-442

#### LOCAL ANTIBIOTIC FOR REDUCTION OF INFECTION OF PROSTHETIC JOINT IN TOTAL HIP REPLACEMENT SURGERY

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**Introduction/objectives:** Prosthesis-related infection is a serious complication for patients after orthopedic joint replacement, specifically in total hip arthroplasty. Prosthesis-related infection is difficult to treat with antibiotic therapy. So, in most cases, removal of the infected prosthesis is the only solution to cure the infection. In this study we compared the results of using or not using local antibiotic for prevention of prosthetic joint infection.

**Methods:** We performed a retrospective chart review of 812 patients underwent total hip replacement surgery in Erfan, Milad and Amiralmomemnin during 2015-2016. The groups were broken down into patients who received local antibiotics (n=426) versus those who did not (n=386) to compare the occurrence of prosthetic joint infection rate. Data were entered in SPSS software ver 16.0 and analyzed. P value lesser than 0.05 considered as significant.

**Results:** The mean age of participants was 53.76±11.37 years old and majority of patients was female (57.88%). There was no difference of age and body mass index in both groups (P>0.05). Number of patients with wound infection was 16 patients in using local antibiotic (3.75%) and 48 patients in non-using local antibiotic (12.4%). The difference between two groups was not significant (P=0.067). Patients receiving local antibiotics had similar blood urea nitrogen and creatinine levels postoperatively compared to the no antibiotics group.

**Conclusion:** We showed that administration of local antibiotics trended towards a preventative effect for PJI in THA patients but was not statistically significant. While the use of local antibiotics may prevent PJI, more data is required especially in the revision arthroplasty groups as clinical trial studies.

## P06 Infection

### P06-382

#### USE OF STERILE ADHESIVE DRAPES FOR PREVENTING SURGICAL SITE INFECTION AFTER TOTAL HIP ARTHROPLASTY

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**Introduction/objectives:** Surgical site infection has been estimated to occur in about 15% of clean surgery and 30% of contaminated surgery cases. Utilization of adhesive drapes to defend the wound from organisms that may be present on the surrounding skin during surgery is one strategy used to prevent surgical site infection. There are conflicting results about its efficacy. In this study we evaluated the use of sterile adhesive drapes for preventing surgical site infection after total hip arthroplasty.

**Methods:** This was a randomized clinical trial study in 764 patients underwent hip surgery in Erfan, Milad and Amiralmomemnin during 2016. Patients were randomly assigned to receiving adhesive drapes (n=367) or non-use of adhesive drapes (n=397) groups. The frequency of surgical site infection was recorded based on culture before and 6months after surgery and compared in two groups. Data were entered in SPSS software ver 16.0 and analyzed. P value lesser than 0.05 considered as significant.

**Results:** The mean age of participants was 51.29±15.88 years old and majority of patients was female (50.91%). There was no difference of age and body mass index in both groups (P>0.05). All patients underwent hip surgery. There were significantly more positive cultures in without adhesive drape group (n=12, 3.05%) than with (n=2, 0.54%) (P<0.01).

**Conclusion:** showed that covering the skin with adhesive drapes seems to decrease recolonization of the skin after antiseptic preparation. However, clinical trials to confirm this finding are warranted.

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## P06 Infection

### P06-121

#### IMPROVED INFECTION ERADICATION RATE AND PATIENT REPORTED OUTCOME WITH FUNCTIONAL ARTICULATING SPACERS IN TWO-STAGE REVISION OF THE INFECTED HIP

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**Introduction/objectives:** We hypothesized that patients treated with two-stage revision arthroplasty of an infected total hip prosthesis with the use of a functional articulating spacer achieved improved patient related outcome while maintaining good infection eradication rate, compared to patients treated with prefabricated antibiotic-loaded spacers.

**Methods:** This study retrospectively included all patients treated with two-stage revision of their infected hip arthroplasty between 2003 and 2016. We contacted all patients to complete HOOS and EQ-5D scores to evaluate patient related outcome. Primary outcome was absence of infection at final follow-up.

**Results:** Seventy patients could be retrospectively included in the study, of which we treated fifteen patients with a functional articulating spacer. Mean follow-up was 37 months.

Spacer dislocation occurred more frequently in patients treated with a prefabricated spacer. The functional articulating group achieved a significantly better HOOS score (66 vs 101, p 0,001) and EQ-5D quality of life (84 vs 69, p<0,001). Infection eradication rate was higher for the functional articulating (93 vs 79% treatment success, p 0,09).

**Conclusion:** Functional articulating spacers are a safe alternative to prefabricated antibiotic-loaded spacers for infection eradication and provide improved patient reported outcome and less complications compared to prefabricated spacers.

## P06 Infection

### P06-107

#### TWO-STAGE REVISION ARTHROPLASTY FOR COAGULASE-NEGATIVE STAPHYLOCOCCAL PERIPROSTHETIC JOINT INFECTION OF THE HIP

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**Introduction/objectives:** We performed this study to evaluate the infection eradication rate after two-stage revision arthroplasty for periprosthetic joint infection caused by Coagulase Negative Staphylococci.

**Methods:** This study retrospectively included all patients treated with coagulase-negative staphylococcal infection of the hip treated with two-stage revision between 2003 and 2016. Primary outcome was absence of infection at final follow-up.

**Results:** We retrospectively included twenty-nine patients in the study, of which ten patients initially had a fractured femoral neck. Four patients had a polymicrobial infection.

Coagulase negative Staphylococci were sensitive to flucloxacillin or clindamycin in thirteen patients. Due to antibiotic resistance of the bacteria we treated fourteen patients with vancomycin and two patients with linezolid.

The mean spacer interval lasted eight weeks. Infection eradication was achieved in 22 out of 29 patients. Because of persistent infection a Girdlestone situation was eventually accepted in five patients and two patients received lifelong suppressive antibiotics. Mean follow-up was forty-two months.

**Conclusion:** Hip fracture patients seem to be at increased risk of periprosthetic joint infection after hip arthroplasty. Polymicrobial infection did not influence infection eradication rate. Coagulase-negative staphylococcal periprosthetic joint infections of a hip prosthesis can often be difficult to treat. Acceptable infection eradication rate can be achieved with two-stage revision hip arthroplasty.

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## P06 Infection

### P06-40

#### QUALITY OF LIFE AND HEALTH STATUS IN PATIENTS WITH A GIRDLESTONE SITUATION AFTER AN INFECTED TOTAL HIP PROSTHESIS

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**Introduction/objectives:** The Girdlestone resection arthroplasty (GRA) is the last option for eradication of a prosthetic joint infection of the hip. This procedure negatively impacts functional outcome and hypothetically also diminishes health status and quality of life. There are no known studies focusing on quality of life after GRA. We aim to compare patients with a Girdlestone situation after an infected total hip prosthesis with a normative population with regard to health status (HS) and quality of life (QoL).

**Methods:** We performed a multicenter cross-sectional study at the Departments of Orthopaedics in three Dutch training hospitals. Participants completed the World Health Organization Quality of Life (WHOQOL-BREF) and the EQ-5D. Scores were compared with Dutch normative data and specified disease entities.

**Results:** In total, 63 (67%) patients who underwent GRA between 1-1-2000 and 1-3-2017 completed the questionnaire set. Mean WHOQOL-BREF domain scores were 11.3; standard deviation (SD) = 1.8 (overall quality of life), 11.4; SD = 2.0 (physical health), 12.9; SD = 2.1 (psychological health), 13.4; SD = 2.9 (social relationships), and 13.1; SD = 2.2 (environment). Mean EQ-5D scores were 2.1; SD = 0.5 (mobility), 2.0; SD = 0.7 (self-care), 2.3; SD = 0.7 (usual activities), 2.0; SD = 0.6 (pain/discomfort), 1.7; SD = 0.7, and mean EQ-5D index score was 0.4; SD = 0.3. All scores were significantly worse comparing to norm scores ( $p < 0.001$ ).

**Conclusion:** Patients' health status and quality of life are grossly impaired in patients with a Girdlestone situation after an infected hip prosthesis. They were significantly lower than Dutch normative scores and even lower than known scores for myocardial infection or lower leg amputees.

## P06 Infection

### P06-58

#### INFECTIONS IN HIP AND KNEE REPLACEMENT: AN ITALIAN ORTHOPAEDIC HOSPITAL ORGANIZATION MODEL

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**Introduction/objectives:** Italy accounts for approximately 100,000 total hip replacement (THR). A serious complication is infection of the surgical site (ISC), which has an impact ranging from 0.5% to 3% for the first implant and it reaches 20% in case of revisions.

Surgical site infection (ISC) is a serious complication in joint replacement with severe impact on patient quality of life. Aim of this study is to provide ISC incidence in our hospital and to highlight how early and multidisciplinary approach in evaluation and treatment this infections represent the cornerstones of our organizational model.

**Methods:** According the SNICH protocol (National Surveillance System of Surgical Site Infections), we conducted an incidence study of all the THR and knee prosthesis (TKR) executed in 2014 with a follow up to a year.

**Results:** Of the 725 interventions supervised (362 THP, 363 TKP - average age 69.6 + 9.43 years, average BMI 29.5 + 5.36), 12 ISC were observed (1.66%), respectively 4 THP (1.1%) and 8 TKP (2.2%). Infections were early (<4-6 weeks) in 6 cases (50%) and delayed in the other 6.8 cases (66.7%) have been treated with a conservative approach (DAIR): prosthesis debridement and retention combined with targeted antibiotic therapy according to infectious disease specialist. In the 4 other cases (33.3%) the two stage replacement was performed (3 of them with late diagnosis).

**Conclusion:** The incidence of ISC in our study reflect international literature data. BMI > 30 is confirmed correlated with higher risk of infection. The DAIR, when performed early, it has a great success rate (66.7%). The patients with ISC has taken charge until fully recovered from a trained multidisciplinary team; this organizational model appear to be efficient and exportable to other realities.

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## P07 Metal ion release and tribology

### P07-580

#### A RARE CASE OF ADVERSE LOCAL TISSUE REACTION TO CERAMIC-ON-CERAMIC TOTAL HIP PROSTHESIS

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#### Case Study: Introduction

It is well documented in the orthopaedic literature that adverse local tissue reaction (ALTR) and pseudotumor formation is a significant complication of metal-on-metal bearing surfaces but not in ceramic-on-ceramic (CoC) hip prosthesis. We report a rare case of ALTR as a complication of CoC hip prosthesis.

**Methods:** A 22 year old female with history of bilateral CoC hip prosthesis because of congenital hip dislocation (right side 7 years before, 4 titanium screws placed for additional fixation of the acetabular cup and auto bone graft from femoral head; left side 3 years). Complains of sporadic pain and squeaking of the right hip. Computed tomography scan showed iliospasm bursitis and apparent increased space in the interface ceramic/ceramic. Subjected to revision surgery with substitution of modular components to polyethylene acetabular cup with a metal head. Intraoperative identification of an anterior ridge acetabular fracture and a loculated region with whitish fluid anterior to the hip joint. The anatomopathological examination of the tissue revealed an inflammatory response with metallic particles.

**Results:** No complications after surgery and in 1 year follow up patient referred no pain in the right hip, making her daily life activities without restrictions. No complains in the left hip with 4 years follow up

**Conclusion:** Some reports exist of this reactions in non-MoM articulations in THA, identifying trunnion wear as a source of metal ions. There is only one case in literature reporting a local adverse reaction in a CoC hip prosthesis. In our case, with the absence of metal-on-metal interfaces and having the modular neck the only source of this particles this can be a possible diagnosis.

## P07 Metal ion release and tribology

### P07-535

#### DOES HIGHLY CROSS LINKED POLYETHYLENE HAS LESS WEAR IN VIVO THAN STANDARD POLYETHYLENE ACETABULAR INSERTS? A DOUBLE-BLINDED RANDOMISED RSA TRIAL.

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**Introduction/objectives:** Highly crosslinked PE performs better in laboratory testing on wear. However not much RSA studies proved whether this holds true in vivo. In order to compare wear rates, a single center RSA, prospective double blind randomized controlled trial was conducted. The primary objective is to investigate the difference in wear at a 60 months interval between the two types of PE by means of RSA.

**Methods:** Fifty-one patients were randomly assigned to receive either a highly cross linked polyethylene or standard polyethylene acetabular inserts. During total hip replacement, RSA images were obtained direct postoperatively and at 6 weeks, 3, 6, 12, 24 and 60 months. HOOS scores were obtained preoperative and at final follow-up. Volume of the PE and medial penetration where used a primary outcome measurement.

**Results:** The main outcomes (medial penetration and volume) both showed a significant difference between the two groups at 60 months in favour of highly crosslinked PE. Medial penetration -0,13 versus 0,01 (PE versus Highly crosslinked PE) and loss of Volume 121,6 versus -12,4 (PE versus Highly crosslinked PE). PROMS showed no difference between the groups.

**Conclusion:** The highly crosslinked PE does not show any significant wear at 5 years while the standard PE clearly does, therefore we conclude that also in vivo highly crosslinked PE is more wear resistant.

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## P07 Metal ion release and tribology

P07-119

TRUNNION FRACTURE FOLLOWING TOTAL HIP ARTHROPLASTY  
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**Case Study:** Trunnion fracture following total hip arthroplasty (THA) is an uncommon complication. We present the case of a 72 year old female who underwent THA in 2008 with a good initial result. She presented 9 years later with sudden onset of left hip pain when getting up from a chair and difficulty weight bearing. Radiographs revealed a fracture of the femoral prosthesis at the head-neck junction.

Intra-operatively, the femoral prosthesis showed marked trunnionosis with metallosis of the surrounding tissues. The polyethylene liner was worn superiorly however the uncemented acetabular component was well fixed. The femoral stem, which was an Accolade® system with a 36+0mm CoCr head and has an ODEP rating 10A\*1, was well fixed in situ. Therefore, an extended trochanteric osteotomy and revision to a long stemmed uncemented prosthesis was performed. Post-operative recovery was uncomplicated.

This case report highlights the rare but important complication of trunnionosis<sup>2, 3</sup> which has seen a rise in incidence due to the introduction of modular designs that introduce a site of increased wear and instability<sup>2, 4</sup>.

Fracture of the trunnion itself has rarely been reported<sup>5,6</sup>. Sparyer et al identified 3 patients with fracture of an Accolade® stem, all in male patients weighing more than 90kg and therefore fatigue loading may have been a significant factor<sup>5</sup>. Our case, in contrast, is a female patient weighing 67kg. Cause is likely to be multi-factorial with factors such as corrosion at the head-neck interface and material properties of the prosthesis playing important roles in this case of prosthetic failure.

## P07 Metal ion release and tribology

P07-359

PSEUDOTUMOR POST 1ST STAGE REVISION SURGERY OF HIP ARTHROPLASTY- A CASE REPORT  
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**Case Study:** Introduction

Pseudotumor is rare complication of Total Hip Arthroplasty (THA). Accumulation of detritus from mechanical wear over long term leads to inflammatory cells resulting in granulomatous reaction, creating a mass. We report a case aseptic loosening of femoral stem which required 1st stage revision surgery in which a pelvic pseudotumor developed.

**Case report:** A 53-year-old man presented with chronic mechanical hip pain of the right side and 5 years ago underwent THA for bilateral avascular necrosis of hip. Postoperatively patient was well and pain free for 2 years. Pain started gradually and worsened progressively 1 week prior to presenting to hospital. Patient was able to ambulate with the aid of crutches. Serial follow up imaging showed aseptic loosening of implant at two years post-operative period which coincided with pain. Inflammatory markers were unremarkable. It was decided only removal of femoral stem with vancomycin cement spacer insertion during the first stage of revision. A year later definitive surgery was planned. Intraoperative noted osteolysis of posterior superior acetabulum wall and a pseudotumor over femoral and acetabular area. Implant removed completely with tumor and vancomycin cement spacer inserted along with a K nail. HPE showed foreign body type of multinucleated giant cells with no evidence of malignancy. Currently patient is well and is planned for definitive surgery in near future.

**Discussion:** Pseudotumor is rare. In this case abnormal friction between two surfaces of cement vs metal from retained acetabular cup. Total excision of implant is paramount to prevent recurrence.

**Conclusion:** Pseudotumor is rare complication however preventable and total surgical excision is vital

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## P07 Metal ion release and tribology

P07-334

METAL SENSITIVITY IN PATIENTS AFTER TOTAL HIP REPLACEMENT - CASES REPORT  
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**Case Study:** Introduction: In 70's numerous papers were published, reporting metal sensitivity in patients after total hip or knee replacement. The rate of patients reporting metal sensitivity dropped significantly during the years, but still remain one of the reasons for early prosthetic loosening according to the Scandinavian and Australian register.  
**Objective:** To remind the auditory about the metal sensitivity, by presenting two patients with Ni allergy after total hip replacement.

**Methods:** Between 2013 and 2017, two patients are retrospectively followed up for developing metal allergy to Ni after total hip replacement. The implant of choice, in both of them, was cementless cup and cementless stem. Both of them were patch tested and allergy to Ni was confirmed.

**Results:** Both patients are closely monitored in 6 months intervals and still there is no evidence of prosthetic loosening.

**Conclusion:** Metal sensitivity nowadays is a rare event using modern hip endoprosthesis. According to the literature if a metal allergy occurs the average life of the implant diminish from 120 months to 78 months. Patients should be patch tested to determine the allergens. The treatment is mainly conservative, but if a severe allergic reaction occurs or the prosthesis is loosened it is wise to be replaced with an implant that doesn't contain metals that causes allergic reaction.

## P08 New technologies

P08-210

VALIDATING THE ACCURACY OF A NOVEL COMPUTER-ASSISTED SYSTEM USING TWO-DIMENSIONAL AND THREE-DIMENSIONAL RADIOGRAPHIC ANALYSIS  
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**Introduction/objectives:** New navigation devices have been designed to improve a surgeon's accuracy in positioning total hip arthroplasty (THA). The purpose of this study was to evaluate the accuracy of intra-operative values for leg length (LL), offset, inclination and version determined by the computer-assisted system (CAS).

**Methods:** 100 primary THA patients were prospectively enrolled from November 2016-March 2017 to assess intra-op accuracy and reliability of the CAS. Patients with pre-existing implants, posttraumatic arthritis, contralateral hip arthroplasty, septic arthritis, or previous hip fracture were excluded. Data was evaluated using post-operative biplanar 3D reconstructions of the pelvis and femur. Ein Bild Roentgen Analyse (EBRA) software and 3D imaging were used to measure acetabular cup version and inclination.

**Results:** Average absolute difference between intra-op and EBRA post-op measurements were  $3.64 \pm 2.9^\circ$  for acetabular inclination and  $5.7 \pm 4.5^\circ$  for acetabular anteversion. The average absolute difference between intra-op and 3D imaging was  $1.06 \pm 0.94^\circ$  for inclination and  $3.26 \pm 3.11^\circ$  for anteversion. Mean absolute error in LL was  $4.3 \pm 3.73$  mm comparing intra-op and 2D post-operative measurements vs  $3.4 \pm 1.8$  mm for intra-op and 3D measurements. The root mean square (RMS) error for cup inclination using EBRA was  $2.7^\circ$  and anteversion was  $4.09^\circ$ . The RMS error with EOS was  $2^\circ$  of inclination and  $3.71^\circ$  of anteversion. There were no post-operative dislocations at 6 weeks follow-up.

**Conclusion:** The use of CAS demonstrated high reliability and accuracy in acetabular and femoral component position and orientation as well as leg length. It provides an additional intra-operative tool for surgeons to improve THA and enable real time intraoperative values.

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## P08 New technologies

### P08-222

INTRAOPERATIVE FEMORAL STEM ANTEVERSION ASSESSMENT IS MORE RELIABLE USING ROBOTIC ASSISTANCE COMPARED TO INTRAOPERATIVE GONIOMETER MEASUREMENT  
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**Introduction/objectives:** To evaluate the ability of robotic assisted technology to accurately report femoral component anteversion as compared to manual goniometer measurement of femoral anteversion.

**Methods:** Twenty patients underwent a MAKO robotic assisted total hip arthroplasty. Manual broaching was performed in what the surgeon perceived to be the appropriate anteversion for the patient. With the final implant in place, anteversion was then measured manually with a goniometer, and then with the MAKO system. After surgery, postoperative CT scans were performed and femoral anteversion was measured by an independent evaluator.

**Results:** Mean femoral anteversion measured using the goniometer was 18.9±6.1 degrees, with the MAKO 9.3±5.9 degrees, and CT measurements 9.3±6.0 degrees. There was a strong relationship between the CT measured anteversion and MAKO measured version (p<0.0001). A poor relationship was found between the CT measured femoral and the manually measured femoral anteversion (p=0.07).

**Conclusion:** Use of the MAKO robotic system reliably measured the femoral stem anteversion intraoperatively as confirmed by independent postoperative CT measurements. Manual intraoperative goniometer measurements do not accurately measure femoral anteversion.

## P08 New technologies

### P08-500

HANDHELD NAVIGATION FOR DIRECT ANTERIOR TOTAL HIP ARTHROPLASTY CUP PLACEMENT  
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**Introduction/objectives:** Traditionally, acetabular component insertion in direct anterior approach (DAA) total hip arthroplasty (THA) has been performed using fluoroscopic guidance. We investigated the use of a new, accelerometer-based, handheld navigation system during DAA THA to compare it to traditional means.

**Methods:** Data was prospectively collected for 200 consecutive DAA THA procedures using a handheld navigation system (HipAlign, OrthoAlign, Aliso Viejo, CA) compared to a group that underwent the same procedure without use of the navigation system. All patients underwent a pre and post-operative AP pelvis radiograph. Acetabular component inclination and version were calculated post-operatively with Elin Bild Roentgen Analyse (EBRA) software. Targeted angles for all cases were 40° ±5 for inclination and 20° ±5 for anteversion. Intraoperative fluoroscopy exposure times were obtained from post-anesthesia care unit radiographs.

**Results:** There were no significant differences in mean postoperative acetabular inclination angles between the navigation group as compared to the non-navigation group (39.1° vs 41.2°) (p=0.7). There were no significant differences in mean postoperative acetabular anteversion angles between the navigation group as compared to the non-navigation group (22.5° vs 24.7°) (p=.6). Mean intraoperative fluoroscopy exposure times were significantly lower in the navigation group as compared to the non-navigation group (p<.0001).

**Conclusion:** The findings demonstrated that a new handheld navigation system was as accurate for cup positioning as fluoroscopically assisted DAA THA. Furthermore, there was a 45% reduction in fluoroscopy exposure time. Reduction in fluoroscopy time will lower radiation exposure for the surgeon and patients.

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## P08 New technologies

### P08-259

DOES ROBOTICALLY ASSISTED TOTAL HIP ARTHROPLASTY RESULT IN SUPERIOR CLINICAL OUTCOMES? A PAIR MATCH-CONTROLLED STUDY  
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**Introduction/objectives:** Recent advances have made robotic assistance a viable option in total hip arthroplasty (THA). However, the clinical outcomes of this procedure relative to THA without robotic assistance have yet to be reported. This study presents short-term outcomes of robotically assisted THA compared to a pair-matched control group of patients that underwent THA without robotic assistance.

**Methods:** Data were prospectively collected on all THAs performed from July 2011 to January 2015. Patients were included if they underwent primary THA treating idiopathic osteoarthritis and were eligible for minimum two-year follow-up. Outcomes were measured using Harris Hip Score (HHS), the Forgotten Joint Score (FJS-12), pain on a visual analog scale (VAS), and satisfaction from 0-10. Patients that underwent THA with robotic assistance were matched 1:1 with THA patients without robotic assistance for age, sex, BMI, and approach.

**Results:** There were 85 patients in each study group. There were no significant differences in the demographic factors matched for. Both HHS and FJS-12 were significantly higher in the robotic assistance group at minimum two-year follow-up. VAS was lower in the robotic assistance group, but this was not statistically significant (p = 0.120). There was a not a significant difference in patient satisfaction. There was no significant difference in the rate of postoperative complications or subsequent revisions between groups.

**Conclusion:** Robotically assisted THA is safe and may lead to superior short-term outcomes compared to THA without robotic assistance.

## P08 New technologies

### P08-469

COMPUTER NAVIGATION FOR REVISION TOTAL HIP ARTHROPLASTY REDUCES DISLOCATION RATES  
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**Introduction/objectives:** Computer-assisted hip navigation offers the potential for more accurate placement of hip components, which is important in avoiding dislocation, impingement, and edge-loading. The purpose of this study was to determine if the use of computer-assisted hip navigation reduced the rate of dislocation in patients undergoing revision THA.

**Methods:** We retrospectively reviewed 72 patients who underwent computer-navigated revision THA between January 2015 and December 2016. Demographic variables, indication for revision, type of procedure, and postoperative complications were collected for all patients. Clinical follow-up was performed at 3 months, 1 year, and 2 years.

**Results:** All 72 patients (48% female; 52% male) were included in the final analysis. Mean age of patients undergoing revision THA was 70.4, mean BMI was 26.4 ± 5.2 kg/m<sup>2</sup>. The most common indications for revision THA were instability (31%), aseptic loosening (29%), osteolysis/eccentric wear (18%), infection (11%), and miscellaneous (11%). During revision procedure, polyethylene component was most commonly changed (46%), followed by femoral head (39%), and acetabular component (15%). At final follow-up, there were no dislocations among all study patients (0%). Compared to preoperative dislocation values, there was a significant reduction in the rate of dislocation with the use of computer-assisted hip navigation (31% vs. 0%; p<0.05).

**Conclusion:** Our study demonstrates a significant reduction in the rate of dislocation following revision THA with the use of computer navigation. Although the cause of postoperative dislocation is often multifactorial, the use of computer-assisted surgery may help to curtail femoral and acetabular malalignment in revision THA.

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## P09 Patient management

### P09-576

#### SELF-WARMING BLANKET VERSUS FORCED-AIR WARMING IN PRIMARY KNEE OR HIP REPLACEMENT. A RANDOMISED CONTROLLED NON-INFERIORITY STUDY

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**Introduction/objectives:** After primary total knee/hip replacement a prosthetic joint infection could develop. Hypothermia could raise the risk of infection. Heating by forced-air can disrupt laminar air flow in the operation room (OR), potentially raising the risk of infection. We aimed to study non-inferiority of an active self-heating blanket compared to a forced-air blanket in preventing hypothermia.

**Methods:** A randomized controlled non-inferiority trial (N=86 patients) was performed comparing a self-heating blanket (SHB) versus a forced-air blanket (FAB) in elective primary TKR/THR patients. Primary outcome was lowest measured temperature during surgery. Secondary outcomes were patients' core temperature before, during and after surgery, thermal comfort visual analogue score (VAS) and complications during hospitalization.

**Results:** Lowest measured temperature was 35.9°C(±0.6) in SHB and 36.1°C(±0.5) in FAB group (p=0.05). No significant correlation was found with duration of surgery or temperature of the OR. No significant difference in core temperature was found before surgery (SHB 36.8°C±0.4, FAB 36.8°C ±0.5, p=0.49), after induction of anesthesia (SHB 36.6°C±0.5, FAB 36.7°C ±0.5, p=0.22) nor as a mean during surgery (SHB 35.8°C±1.6, FAB 36.0°C±1.3, p=0.68). SHB patients were 'colder' at the recovery bay, 35.8°C(±0.6) compared to FAB patients, 36.1°C(±0.5) (p=0.04). Mean VAS thermal comfort was 53.3(±15.7) in SHB and 52.9(±12.3) in FAB patients. No difference in complication rate was found.

**Conclusion:** In this study neither kind of the warming blanket prevented perioperative hypothermia. Although a difference of 0.2°C was found between both groups at the end of TKR/THR surgery, this is most probably not clinically relevant. Complication rate in both groups was the same.

## P09 Patient management

### P09-285

#### COMMUNICATION, COPING, AND CLINICAL STATUS: A HOLISTIC PERSPECTIVE ON TJA PATIENTS TO IMPROVE SATISFACTION

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**Introduction/objectives:** Introduction. Despite good functional outcomes, up to 30% of patients report dissatisfaction after total joint arthroplasty (TJA). Satisfaction may improve if care provision is tailored to specific patient subgroups. Objectives. The aim of the current study was to define patient subgroups from a biopsychosocial perspective by assessing patients' communication, coping, and clinical characteristics.

**Methods:** Methods. In a single-centre retrospective study, we assessed the preoperative clinical status, coping behaviour and communication preferences of 191 patients (70.6 ± 8.7 years, 61% female) that had received primary TJA. Subgroups were identified using hierarchical and k-means cluster analyses. The cluster solution was validated in two multivariate analyses that compared subgroups on 1) characteristics and 2) postoperative outcomes and satisfaction. A decision tree for patient classification was developed using recursive partitioning (machine learning).

**Results:** Results. Three subgroups were identified that differed in outcomes (p=.006). Cluster 1 (44%) had an overall lower clinical status, preferred personal communication, and was less satisfied with outcomes. Cluster 2 (32%) was characterized by better clinical status, less pronounced communication preferences, and high satisfaction. Cluster 3 (24%) was characterized by higher age, higher anxiety, lower self-efficacy for communication, and lower satisfaction with communication. Using 3 questions, future patients can be classified with 76% certainty.

**Conclusion:** Conclusions: A holistic perspective on patients may be required to understand (dis)satisfaction with TJA. The identified subgroups provide direction for tailored care provision, such as patient education and pain coping skills training.

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## P09 Patient management

### P09-200

#### IT POSSIBLE TO REDUCE THE COST AND LENGTH OF STAY FOR INTRACAPSULAR NECK OF FEMUR FRACTURES?

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**Introduction/objectives:** We sought to establish whether procedure choice (hemiarthroplasty vs THR) for patients with a fracture to the neck of femur (NOF) affects the length of stay at our institution. We sought to determine the economic impact of this choice.

**Methods:** All patients presenting to our institution with a NOF fracture were identified retrospectively. Those with an American Society of Anesthesiologists (ASA) score <2, and Abbreviated Mental Test Score (AMTS) <8 were included. Patients were matched according to their comorbidities. Postoperative length of stay was deduced from hospital notes and data compared for the 2 populations.

**Results:** 27 patients were included in this study. Average length of stay for patients was 9 days and 18 days for THR and hemiarthroplasty patients respectively. This may save approximately 126 bed days for the 14 fractured NOF patients who received hemiarthroplasty when they were eligible for THR. Using an estimated cost per bed-day of £400, this is a potential saving of £50,400 per annum.

**Conclusion:** THR for management of displaced intracapsular NOF fracture reduces the average length of stay of patients compared to management using hemiarthroplasty. At our institution, this represents a saving of 126 bed days annually, equating to £50,400. Opting to manage active elderly patients presenting with a fractured NOF with THR as opposed to hemiarthroplasty is one technique of tackling the bed crisis faced by the NHS. Our study is limited by the small cohort size, and the utilisation of only short-term outcomes for cost analysis. Further study is required to fully characterise the cost-benefit THR management for fractured NOF patients offers compared to hemiarthroplasty.

## P09 Patient management

### P09-508

#### TRANSFUSION RATE USING INTRAVENOUS TRANEXAMIC ACID IN HIP REVISION SURGERY

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**Introduction/objectives:** Hip revision surgery is associated with a high probability of the necessity for a blood transfusion. Different studies support the use of tranexamic acid (TXA) to decrease the rate of transfusions in primary hip surgery. Nevertheless, the use of this drug in hip revision surgery has not yet been widely accepted. The aim of our study was to establish the rate of blood transfusion with and without TXA in hip revision surgery.

**Methods:** We retrospectively studied 125 hip revision surgery patients operated on between 2011 and 2014. We divided our series into 2 groups: the TXA group with 61 patients (in which a 1000 mg dose of TXA was used before the skin incision and a second identical dose after skin closure) and a control group with 64 patients. We analysed the red blood cell (RBC) transfusion rates and their odds risk as well as the presence of collateral complications.

**Results:** Average RBC transfusion was 2.7 units/patient (range 0-6) in the control group compared to 1.6 units/patient (range 0-6) in the TXA group. A 90.11% (odds ratio [OR] 0.098; confidence interval [CI] 0.02-0.04; p<0.0029) odds risk reduction for transfusion of at least 1 unit of erythrocyte blood cell was observed in the TXA group. Complications associated with the TXA were similar in both groups.

**Conclusion:** The benefits of TXA have been shown in elective hip replacement. In this study, TXA proved to be safe and efficacious in reducing the need for transfusions following revision total hip arthroplasty

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## P09 Patient management

### P09-502

THE RISK OF ALLOGENEIC BLOOD TRANSFUSION IS RELATED TO THE PREOPERATIVE HEMOGLOBIN LEVEL  
Meermans, G.\*<sup>(1)</sup>; Van Assche, V.<sup>(1)</sup>; Eijssbouts, X.<sup>(1)</sup>  
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**Introduction/objectives:** Several studies have demonstrated that the preoperative hemoglobin (Hb) level is an independent predictor for allogeneic blood transfusion after total hip arthroplasty (THA). The primary aim of this study was to determine a preoperative threshold level of Hb that would identify those patients that are at greatest risk of requiring transfusion.

**Methods:** We reviewed the data of 728 patients undergoing primary THA after the introduction of a blood management protocol in our department. All patients were operated using a posterior approach and received a weighted dose of 30 mg/kg of TXA unless contraindicated. A standardized transfusion trigger was used postoperatively.

**Results:** The overall transfusion rate was 2.1%. The transfusion rate in men (1.0%) was lower than in women (2.8%) but this was not significant ( $p=0.06$ ). The preoperative Hb was 11.5 g/dl SEM 0.26 in those who were transfused and 14.0 g/dl SEM 0.04 in those who were not ( $p < 0.0001$ ). ROC curves for men women were created and using coordinates on the curve, threshold values of 11.7 g/dl for males and 12.65 g/dl for females were identified with optimal sensitivity and specificity (98.5% and 83.1%) respectively. In relation to WHO criteria, the transfusion rates were 16.4% in anemic patients and 0.9% in non-anemic patients. In relation to the thresholds found in the current study, the transfusion rates were 14.2% compared with 0.3%.

**Conclusion:** Pre-operative levels of Hb of 12.65 g/dl in females and 11.70 g/dl in males undergoing THA have been identified as predicting blood transfusion with the greatest combined sensitivity and specificity. Using these thresholds preoperatively could potentially reduce transfusion requirements while minimizing the morbidity associated with excessive optimization

## P09 Patient management

### P09-161

EVALUATION OF THE IMPLEMENTATION OF A TRANEXAMIC ACID PROTOCOL IN PRIMARY HIP ARTHROPLASTY  
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<sup>(1)</sup> Bravis Hospital, Roosendaal, Netherlands

**Introduction/objectives:** Tranexamic acid (TXA) is widely used to decrease blood loss and the need for transfusion. There remains a lack of consensus regarding the optimal regimen. The goal of this study was to investigate how many patients actually received TXA after implementation of a blood management protocol.

**Methods:** This was an analysis of data on 450 primary THAs performed by a single surgeon from March 2014 until October 2016. The data were prospectively collected as part of another blood management study, which included a single dose of 30 mg/kg TXA. Contraindications for TXA were a recent thrombotic event, severe kidney failure, or allergy and were discussed preoperatively with the consultant anesthetist. The dose of TXA and the reason for not giving TXA were recorded.

**Results:** Overall, 23 of 450 patients did not receive TXA (5.1%). In 10 patients (43.5%), TXA was not given for another reason than one of the established contraindications. The rate of patients that did not receive TXA was significantly greater in the first 4 cohorts of 50 patients (respectively 14%, 10%, 8%, and 8%) compared with the next 5 cohorts of 50 patients (respectively 0%, 0%, 2%, 4%, 0%) ( $p=0.006$ ). Eight patients had an allogeneic transfusion postoperatively (1.8%). The transfusion rate in patients that did receive TXA (4/427; 0.94%) was significantly lower compared with patients that did not receive TXA (4/23; 17.4%) ( $p<0.0001$ ).

**Conclusion:** The overall transfusion rate was very low (1.8%). In the first 200 patients after implementation, the number of patients not receiving TXA was significantly higher. It is important to implement a blood management protocol correctly and to avoid withholding TXA, besides the well-established contraindications, and prevent unnecessary transfusions.

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## P09 Patient management

### P09-400

TRANEXAMIC ACID AND LOWERING PERIOPERATIVE BLOOD LOSS IN TOTAL HIP ARTHROPLASTY  
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<sup>(1)</sup> Tehran University of Medical Science, Tehran, Iran, Islamic Republic of

**Introduction/objectives:** There can be considerable blood loss perioperation of total hip arthroplasty requiring blood transfusion, considering transfusion could accompany much cost and serious risks and complications. We design this cohort to evaluate does tranexamic acid could reduce blood loss and subsequently blood transfusion

**Methods:** In a prospective cohort study 45 patient in tranexamic acid(TXA) group got a single injection of 15mg/kg TXA on operating table before surgical incision and, we had 45 patients in control group. Total blood loss was calculated from haemoglobin(Hb) balance preoperatively and post operation day(POD) 1 and 3, intraoperative blood loss was estimated volumetrically and visually from bloody gauzes. Both groups received Aspirin as anticoagulation medication. All operation performed from minimally invasive direct anterior approach

**Results:** With the threshold of Hb under 8 g/L for transfusion there were no blood transfusion in TXA group compare to 8 patients in control group. Mean Intraoperative blood loss in TXA group was 500cc(300-750cc) and we had 2g/L reduction in Hb concentration(1-4g/l) compare to 800cc(500-1100cc) blood loss and 4g/L(2-6g/L) reduction in Hb in control group. No thromboembolic complications occurred in both groups

**Conclusion:** In light of great potential of TXA in lowering blood loss and need for transfusion in total hip arthroplasty and considering its cost we recommend for routine use of TXA in total hip arthroplasty patients

## P09 Patient management

### P09-461

TREATMENT OF HEPATITIS C VIRUS MAY IMPROVE OUTCOMES IN TOTAL HIP ARTHROPLASTY RECIPIENTS  
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**Introduction/objectives:** As the chronically infected HCV population ages, the demand for total hip arthroplasty (THA) will increase. Previous reports demonstrate that HCV infection may predispose patients to inferior postoperative outcomes following THA. No study to date has evaluated surgical outcomes in THA recipients that have been successfully treated for HCV. The purpose of the current study was to assess surgical outcomes following THA in patients that have been successfully treated for their HCV infection compared to patients that did not receive treatment.

**Methods:** A retrospective review of all patients diagnosed with HCV that underwent primary unilateral and bilateral THA between January 2006 and April 2017 was conducted. Patients were divided into two cohorts: (1) patients that received treatment for HCV (HCV-T) and (2) patients that did not receive treatment for HCV (HCV-NT). All patient variables including demographics, HCV infection characteristics, operative details, in-hospital complications, clinical follow-up, and revisions were carefully studied.

**Results:** 26 patients (32 hips) were in the HCV-T cohort, and 32 patients (38 hips) were in the HCV-UT cohort. Mean age at surgery was 59.5±7.3 and 60.0±10.2 years in the HCV-T and HCV-UT cohorts, respectively. Mean follow-up time was 26.3±23.4 and 31.7±28.3 months in the HCV-T and HCV-UT cohorts, respectively. There were significantly more in-hospital complications ( $p<0.01$ ) and more patients required THA ( $p=0.04$ ) in the HCV-UT cohort compared to the HCV-T cohort, respectively.

**Conclusion:** Treatment of HCV prior to primary THA can reduce the incidence of in-hospital complications and need for revision THA. HCV treatment regimens should be a part of patient optimization prior to THA.

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## P09 Patient management

### P09-152

#### EFFICACY AND SAFETY OF TRANEXAMIC ACID ADMINISTRATION FOR PERIOPERATIVE BLOOD LOSS CONTROL IN HIP HEMIARTHROPLASTY

Papadimitriou, E.\*<sup>(1)</sup>; Makridakis, S.<sup>(1)</sup>; Kalifis, G.<sup>(1)</sup>; Lamprakakis, P.<sup>(1)</sup>; Staikos, N.<sup>(1)</sup>; Vidalis, S.<sup>(1)</sup>; Giota, A.<sup>(1)</sup>; Gikas, E.<sup>(1)</sup>

<sup>(1)</sup> General Hospital of Chalkida, Chalkida, Greece

**Introduction/objectives:** Presentation of influence of tranexamic acid (TXA) in perioperative blood loss control in hip hemiarthroplasty surgery.

**Methods:** 31 patients were treated with hip hemiarthroplasty for femoral neck fracture with intravenous administration of TXA (1gr TXA 20min preoperative & 1gr TXA during wound closure) and were compared to 24 patients without TXA (control group). Hemoglobin levels drop, drainage volume and need for transfusion were measured in both groups.

**Results:** No statistically significant difference was found between 2 groups for age, sex, BMI, surgery duration, anaesthesia, hospitalization, INR and platelet count. TXA group showed significantly smaller hemoglobin drop than control group (-6.96% vs -11.82% at 12h post-op, -10.18% vs -21.87% at 24h post-op  $p < 0.05$ ). Drainage volume at 24h post-op was 335,33ml and 92ml for control and TXA group respectively ( $p < 0.05$ ). 13 patients in control group needed transfusion with 21 units of packed red blood cells pRBC vs 6 patients with 6 units pRBC in total in TXA group. No deep venous thrombosis or pulmonary embolism appeared in TXA group.

**Conclusion:** Intravenous administration of TXA in hip hemiarthroplasty for femoral neck fracture is a very effective, easy and safe method to reduce perioperative blood loss and need for transfusion.

## P09 Patient management

### P09-349

#### EFFICACY AND SAFETY OF TRANEXAMIC ACID ADMINISTRATION FOR PERIOPERATIVE BLOOD LOSS CONTROL IN TOTAL HIP ARTHROPLASTY

Papadimitriou, E.\*<sup>(1)</sup>; Makridakis, S.<sup>(1)</sup>; Kalifis, G.<sup>(1)</sup>; Lamprakakis, P.<sup>(1)</sup>; Staikos, N.<sup>(1)</sup>; Vidalis, S.<sup>(1)</sup>; Giota, A.<sup>(1)</sup>; Gikas, E.<sup>(1)</sup>

<sup>(1)</sup> General Hospital of Chalkida, Chalkida, Greece

**Introduction/objectives:** Presentation of influence of tranexamic acid (TXA) in perioperative blood loss control in total hip arthroplasty.

**Methods:** 29 patients underwent a total hip arthroplasty with intravenous administration of TXA (1gr TXA 20min preoperative & 1gr TXA during wound closure) and were compared to 28 patients without TXA (control group). Hemoglobin levels drop, drainage volume and need for transfusion were measured in both groups.

**Results:** No statistically significant difference was found between 2 groups for age, sex, BMI, surgery duration, anaesthesia, hospitalization, INR and platelet count. TXA group showed significantly smaller hemoglobin drop than control group (-9.16% vs -19.02% at 12h post-op, -13.25% vs -22.44% at 24h post-op  $p < 0.05$ ). Drainage volume at 24h post-op was 388,56ml and 111,68ml for control and TXA group respectively ( $p < 0.05$ ). 15 patients in control group needed transfusion with 24 units of packed red blood cells pRBC vs 8 patients with 9 units pRBC in total in TXA group. No deep venous thrombosis or pulmonary embolism appeared in TXA group. 2 patients of TXA group developed acute myocardial infarction one week after discharge and one of these passed away.

**Conclusion:** Intravenous administration of TXA in total hip arthroplasty is a very effective, easy and safe method to reduce perioperative blood loss and need for transfusion.

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## P09 Patient management

### P09-90

#### ASSESSMENT OF THE IMPACT OF AN ACCELERATED RECOVERY PROGRAM IN THA

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**Introduction/objectives:** In 2013 an accelerated recovery program was introduced for primary total hip arthroplasty in an university hospital. The program included a multidisciplinary approach with the use of regional anesthesia, periarticular infiltration, systematic use of tranexamic acid, abbreviated fast, and maltodextrin.

**Objectives:** A quasi-experimental design, pre and post intervention study was carried -out to measure the impact of the aforementioned program in hip surgery.

**Methods:** From 2013 until 2016, 322 patients (group A) undergoing THR were enrolled in this prospective study to examine the efficacy of an accelerated recovery program. The control group (B) consisted of 296 patients with same inclusion criteria operated prior to 2013. Outcome variables were, days of hospitalization, prolonged hospitalization, (greater than 3 days), poor control of pain, (requirement of an additional analgesic scheme), re-hospitalizations, established as number of re-admissions after hospital discharge.

**Results:** Mean days of hospitalization of group A was 1.6 (1,2-4,3). Group B had a mean length of stay of 2.9 days (1,8-7,4),  $p > 0,01$ .

The RR of prolonged hospitalization for B was 2.57.

The cumulative days of prolonged hospital was 39 for group B vs 9 for A,  $p > 0,01$ .

57 patients had poor pain control in group B vs 8 in A,  $p > 0,01$ .

RR of having poor control pain in group B was 4.1.

9 patients had re-admissions in the group B vs 5 in A  $p > 0,14$ . Total days of re-admission were 17 days for group B vs 4 for A. RR of re-hospitalization was 1.4 for group B.

**Conclusion:** The construction of multimodal accelerated recovery programs allowed to, improve the pain control, reduce the days of hospitalization, and decrease the number of annual bed days used even in ASA III patients.

## P09 Patient management

### P09-424

#### POSTOPERATIVE PAIN MANAGEMENT IN PATIENTS OLDER THAN 80 YEARS AFTER HIP JOINT ARTHROPLASTY.

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**Introduction/objectives:** Most of the patients suffering arthroplasty of the hip joint are patients of the older age group, the average age of persons with a hip fracture is 80 years. There are many specific features in each stage of treatment of such patients, from examination to late rehabilitation. It is important to manage postoperative pain syndrome. Pain management in old patients differs from standard protocols. The objective was to retrospectively evaluate effectiveness of the complex used in our clinic to reduce pain after hip arthroplasty in old patients

**Methods:** 27 patients (22 female, 5 male) after hip arthroplasty from 80 to 96 years in "Clinic number one" Obninsk, period 2016-2017. In 24 cases, a bipolar prosthesis was installed, 7 of which was a cementless type of fixation of the femoral component, in 3 cases - a total cement endoprosthesis. Pain questionnaire including objective and subjective arguments was used to assess the condition and severity of pain syndrome.

**Results:** the proposed algorithm for VAS: 9 patients - no pain (00-04), 15 patients - mild pain (05-44), 3 patients moderate pain (45-74).

**Conclusion:** applied algorithm allowed to remove the positional component of pain by means of early activation and functional styling of patients. Use of multimodal analgesia reduced overall pain syndrome. Talking to patients about the differences in aetiology of post-traumatic and post-operative pain, understanding of expectations from analgesia is a powerful psychological factor/tool for postoperative pain syndrome treatment.

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## P09 Patient management

### P09-370

#### DOES TRANEXAMIC ACID REDUCE THE INCIDENCE AND GRADE OF HETEROTOPIC OSSIFICATION FOLLOWING PRIMARY THA?

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**Introduction/objectives:** Heterotopic ossification (HO) represent one of the most frequent complications following total hip arthroplasty (THA) with a reported incidence of up to 42% in recent studies. The purpose of our study was to investigate the influence of intravenous (IV) application of tranexamic acid (TXA) on the incidence and grade of HO following primary THA.

**Methods:** A retrospective study (level III) was performed on 256 female and 184 male patients (468 THPs, of those 28 bilateral) who underwent primary THA performed by the same surgical team between 2012 and 2017 and had available 12 month postoperative radiographs. In 215 (46%) cases TXA IV was administered perioperatively and after 6 hours. In 253 (54%) cases TXA was not used. Brooker classification was used to evaluate the ossifications and the difference in Brooker-scores was calculated (difBrooker). Ordinal regression model was used to estimate the effects of TXA as well as patients' age, gender, surgical approach (anterior, direct lateral), type of implant (Zimmer Alloclassic, DePuy Corail) and use of local infiltrative analgesia (LIA) on the incidence of HO.

**Results:** Patients who received TXA showed lower difBrooker scores in comparison to non-treated patients but the difference was not statistically significant ( $p=0,34$ ). Only gender ( $p<0,01$ ) and age ( $p<0,01$ ) demonstrated positive correlation with difBrooker, indicating that younger patients and women were less inclined to HO formation following primary THA. Other analyzed factors had no influence on incidence and grade of HO.

**Conclusion:** Although TXA reduces blood loss it does not seem to lower the incidence of HO. The incidence and grade of HO following primary THA were significantly lower in younger patients and women.

## P09 Patient management

### P09-458

#### LOCAL TRANEXAMIC ACID PLUS DILUTED EPINEPHRINE VS. INTRAVENOUS TRANEXAMIC ACID FOR REDUCING BLEEDING IN REVISION TOTAL HIP ARTHROPLASTY

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**Introduction/objectives:** Total joint replacement surgery is associated with large amounts of blood loss and significant rates of transfusions. Postoperative bleeding is one of the most important problems after major orthopedic surgeries including revision Total Hip Arthroplasty (THA). It has been demonstrated that Tranexamic acid is a useful agent to control the volume of blood loss. However, the more effective route of TXA administration remained controversial.

**Methods:** In current study, we compared the effects of local and intravenous (IV) administration of TXA on need to blood transfusion and hemoglobin drop. We randomized 80 patients undergoing revision THA into two groups: local group and IV group. In group IV 40 patients was administered TXA 4 g alone systemically and in local group 40 patients the joint was irrigated with 4 g of TXA plus 0.33mg DEP (1:200,000).

**Results:** The level of Hb was measured before and after operation and the rate of Hb drop was compared. Also, the blood transfused were compared in two group. Results showed topical TXA plus DEP substantially reduced total blood loss, hidden blood loss and transfusion rate compared with TXA alone, without increasing the risks of hemodynamic complexity.

**Conclusion:** We conclude that local use of TXA plus DEP was crucially effective and safe option compared with intravenous TXA alone in reducing total and hidden blood loss and transfusion rate following revision THA without considerable complications.

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## P09 Patient management

### P09-56

#### TOTAL HIP REPLACEMENT SURGERY: EFFECTS OF NEUROMUSCULAR TAPING ON EDEMA, SWELLING AND HEMATOMA

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**Introduction/objectives:** Italy accounts for approximately 100,000 total hip replacement surgery (THR), after France (130,000).

Edema commonly accompanies this surgical procedures; specific treatments may decrease swelling and consequent restrictions on postoperative exercises, speeding recovery and reducing hospitalization costs, as recently suggested by Zeng et al. Edema management commonly includes expensive procedures in terms of time-cost resources and materials. Aim of this study is to evaluate the efficacy of the NMT in order to reduce the temporary post-surgical insufficiency of lymphatic system after THR.

**Methods:** Fifty patients (F=29, M=21, mean age= 66,27 +/- 9,8) underwent to a THR were randomly grouped into an experimental group (mobilization exercises and NMT treatment, n= 23) or a control group (mobilization exercises and declive limb posture, n= 27). All patients were treated one hour/day for two weeks and evaluated with validated scales (NRS, WOMAC, ROM, MRC) and using lower limb size measured on the third day after surgery, after one week of NMT application, and at discharge.

**Results:** Edema and pain reduction in the experimental group was better and faster than the control group ( $p< 0,01$ ), while there were no significant differences regarding ROM, MRC and WOMAC.

**Conclusion:** In literature there is no unanimous evidence about the efficacy of NMT. In Kalron meta-analysis, a moderate level of evidence in support of a better pain management in patients treated with taping has reported, but no evidence about circumference reduction of limb has been collected. In our study, instead, NMT appeared to be effective on edema secondary to THA surgery; the protocol applied at the experimental group seems to be feasible, cheaper and exportable to other realities.

## P10 Primary THA

### P10-182

#### DOES THREE-DIMENSIONAL THA PREOPERATIVE PLANNING AID ACETABULAR CUP POSITIONING?

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**Introduction/objectives:** The present study evaluated the usefulness of CT-based three-dimensional THA preoperative planning for acetabular cup positioning.

**Methods:** This study included 120 hips aged 36–85 years, who underwent primary THA using CT-based THA preoperative planning software ZedHip (LEXI, Japan) and postoperative CT imaging. Preoperatively the optimum cup size and position in the acetabular were decided using ZedHip, taking into consideration femoral anteversion and to achieve the maximum ROM in dynamic motion simulation. Radiographic inclination (RI) was selected in the range between 40°–45° and radiographic anteversion (RA) in the range between 5°–25°. Three-dimensional planning images of the cup positioning were obtained from ZedHip, and the distances between the edge of the implant and anatomical landmarks were measured on the three-dimensional images and recorded. Intraoperatively, the RI and RA were confirmed by reference to these distances and the acetabular cup was inserted. The difference between the preoperative planning and the actual implant position was measured to assess the accuracy of acetabular cup positioning using ZedHip.

**Results:** Actual cup size corresponded with that of preoperative planning in 95% of cases (114 hips). Postoperative mean RI was  $42.3^\circ \pm 4.2^\circ$  and mean RA was  $16.1^\circ \pm 5.9^\circ$ . Deviation from the target RI was  $4.2^\circ \pm 3.7^\circ$  and deviation from the target RA was  $4.0^\circ \pm 3.6^\circ$ . Overall 116 hips (96.7%) were within the RI safe zone (30° ~ 50°) and 108 hips (90.0%) were within the RA safe zone (5° ~ 25°), and 105 hips (87.5%) were within both the RI and RA safe zones.

**Conclusion:** CT-based three-dimensional THA preoperative planning is effective for acetabular cup positioning, and has better cost performance than expensive CT-based navigation.

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## P10 Primary THA

### P10-325

UNCEMENTED DIAPHYSEAL FIXED TYPE STEMS IN PATIENTS WITH PSEUDARTHROSIS OF THE FEMORAL NECK  
Bondarenko, S.\*<sup>(1)</sup>; Filipenko, V.<sup>(1)</sup>; Prudnikov, Y.<sup>(2)</sup>; Badinaoui, A.<sup>(1)</sup>; Tankut, O.<sup>(1)</sup>  
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**Case Study:** Background: achieving stable and long-term stem fixation in patients with pseudarthrosis of the femoral neck during THA is technically challenging due to bone defects at the level of lesser trochanter and due to osteoporosis. Aim: to retrospectively evaluate the results of the use of uncemented diaphyseal fixed type stems in pseudarthrosis of the femoral neck.

**Material and methods:** 47 patients (47 hips) with pseudarthrosis of the femoral neck underwent THA after failed treatment of femoral neck fracture. The average age was 67.2 (29-79) years old, 16 males and 31 females. 18 patients with the presence of hardware in the proximal femur. Uncemented diaphyseal fixed type stem was used in all cases. Cancellous grafting for the reconstruction of cavity defects of proximal femur was performed in 17 cases. Uncemented "press-fit" cups were used in 25 cases, cemented cups in 22 cases.

**Results:** 4 patients dropped out of the study. The remaining 43 patients were followed for a mean 4.2 (3.4-6.5) years. Harris Hip Score improved from 32 to 86 points. Survivorship for aseptic femoral loosening was 100%. Bone graft incorporation was observed in all cases. There were 2 cases of intraoperative periprosthetic fracture of the proximal femur. Dislocation of the femoral head occurred in 2 cases.

**Conclusion:** THA with the use of uncemented diaphyseal fixed type stems is a viable treatment option in patients with pseudarthrosis of the femoral neck in the studied follow-up.

## P10 Primary THA

### P10-283

HIGH RATE OF THA DISLOCATION AFTER ISOLATED LINER CHANGE RELATED TO WEAR AFTER PRIMARY THA  
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**Introduction/objectives:** Given to the current literature, dislocation after primary total hip arthroplasty (THA) is one of the most common complications with a frequency report to be 0.2-10%. The risk of dislocation is even higher after revision surgery. Changing a liner, because of wear, becomes necessary in 9.7-19% and is therefore one of the most important reasons for revision surgery. The purpose of our study was to assess the frequency of THA dislocation in patients, those underwent an isolated liner exchange because of wear.

**Methods:** Between 2000 and 2014, 80 patients (82 THA) underwent an isolated liner exchange after primary THA at our department. We only included those patients, who underwent an isolated liner exchange and had no prior dislocation before revision surgery. We retrospectively reviewed medical histories to assess surgical approach, cup position, cup migration using Einzelbild-Röntgen-Analyse (EBRA) software, clinical outcome and well known risk factors (drug- or alcohol abuse, Parkinson's disease, dementia etc.).

**Results:** Out of 82 isolated liner changes, 13 patients (13 hips) experienced a postoperative dislocation of the THA. The EBRA results showed a mean cup anteversion of 16.7° (SD 5.67°) and a mean cup inclination of 45.35° (SD 11.48°) and did not differ between the dislocated THAs and those without. None of the investigated risk factors showed a statistically significance. In our study, a dislocation frequency of 15.9% was observed.

**Conclusion:** The large number of liner changes related to wear, might suggest other reasons for THA dislocation like periprosthetic osteolysis due to high periparticular concentrations of polyethylen particles or adverse local tissue reaction/inflammation. Further studies and further investigations are highly needed.

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## P10 Primary THA

### P10-367

THE MIGRATION PATTERN OF A ZWEYMÜLLER HIP STEM: A RSA STUDY WITH TWO YEARS FOLLOW-UP  
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**Introduction/objectives:** After the original introduction of the Zweymüller stem, small modifications in shape and surface have been undertaken by different companies to create a unique stem for each company while the basic features were preserved. The CBH stem by Malthys (Bettlach, Switzerland) was introduced on the market in 1999, by the end of 2013 more than 32.000 were implanted around the world. Introduction to the Dutch market occurred in 2009 and 1600 stems have been implanted since. The aim of this study was to document the sustainability of this implant by use of Roëntgen Stereophotogrammetric Analysis (RSA).

**Methods:** Thirty-five patients were included, four patients were lost to follow-up and two patients were excluded for analysis due to high CN numbers. RSA images were made postoperatively (within 5 days) and at 3, 6, 12 and 24 months. Due to skewed distributions, nonparametric tests were used for the analysis of the RSA data. Median values were given with interquartile ranges. Friedman tests were performed to assess migration. Wilcoxon Signed Ranks tests were used for pairwise comparisons between examinations.

**Results:** RSA analysis of 33 patients showed a significant proximodistal migration of 0.97mm and median anteversion-retroversion rotation of 1.12° up to 3 months, after which the stem stabilized and showed no further significant movement. A maximum total point migration of 1.29mm was seen at 3 months and of 1.78mm at 2 years. Initial subsidence of >2mm was observed in eight patients, with a maximum subsidence of 6mm. In one patient, continuous migration is present at all follow-up moments.

**Conclusion:** The CBH stem shows a stable migration pattern after initial settling at three months, predicting satisfactory long-term outcome.

## P10 Primary THA

### P10-468

LONG-TERM RESULTS AFTER TOTAL HIP ARTHROPLASTY IN PATIENTS OF DIFFERENT AGE GROUPS  
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**Introduction/objectives:** THA is considered as the one of the most effective surgeries in treatment of patients with severe hip joint pathology with survival rate up to 95%. However, in patients of different age groups in the long-term period, the results of joint replacement can vary significantly. Objective: multifactorial analysis of long-term results of tha in patients of different age groups with different level of motion activity and different types of implants.

**Methods:** We got feedback in 2043 observations. 83 patients died. The mean age of the patients was 58 years. The mean follow-up period is 10.4 years. We assessed factors affecting the long-term survival of prostheses and the quality of life of patients based on standard questionnaires.

**Results:** The mean level of motion activity in the group of young patients was 6156, and patients older than 50 years - 5546. When using cross-link polyethylene liners, the mean wear level was 0.14 mm per year, when using liners from standard polyethylene, the mean wear level was 1.3 times higher, depending on the manufacturer. Also, level of linear wear was influenced by several factors - BMI, the angle of the acetabular component, but the greatest one was the level of motion activity. The 10-year survival rate in patients under the age of 50 years is 88.5%, and in the older group 96.8%. The rate of early revisions is 2 times higher in the younger age group, and the rate of late revisions is 3.7 times higher.

**Conclusion:** The rate of early revisions depends on the complexity of the pathology, and rate of late revisions associated with bearing wear, which is most influenced with the level of motor activity of patients.

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## P10 Primary THA

### P10-472

#### INFLUENCE OF DIFFERENT FACTORS ON THE CUP POSITION

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**Introduction/objectives:** The total hip arthroplasty leads to a steady increase of the number of surgeries performed everywhere. At the same time increases the number of performed revision surgeries. The causes of failures of THA can be the cup malposition.

**Methods:** We evaluated cup inclination and anteversion depending on different factors in 1,374 patients (1,408 joints) after primary THA.

**Results:** With anterolateral approach the incorrect angle of inclination of the acetabular component was observed in 11.2 % and the angle of anteversion in 19.6 % of cases. Analysis of the radiographs of patients operated by six different surgeons performing more than 100 THA per year did not reveal clinically significant differences in the angles of cup inclination and anteversion, with a statistically significant difference. We did not identify correlations between the BMI and cup inclination and anteversion angles, although there was a tendency for more vertical cup positioning with increasing of BMI. The analysis of radiograph measurements of patients with dislocations showed that in most cases the angle of cup inclination and anteversion is within the acceptable limits (76.4 % and 70.9 % respectively).

**Conclusion:** Factors increasing the risk of malposition were the BMI, MIS and the experience of the surgeon. The analysis of the obtained data did not allow to reveal the direct influence of the cup position on the dislocation rate. The multifactorial causes of hip dislocation requires a more detailed study of additional factors directly or indirectly affecting the functioning of the implant

## P10 Primary THA

### P10-517

#### LONG TERM RESULTS OF METAL ON METAL HIP ARTHROPLASTY IN YOUNGER PATIENTS

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**Introduction/objectives:** Metal on Metal (MoM) hip arthroplasty saw a new era of popularity with the development of its second generation bearing surfaces, in the first decade of this century. However, by the end of last decade, concerns had been raised due to metal debris related complications. We aimed to determine the survival of MoM stemmed hip replacement in the younger population. We also studied the rate of revision related to adverse reaction to metal debris (ARM) along with reviewing the clinical and radiological progress of MoM hip arthroplasty in younger age (<55yrs) group.

**Methods:** This is a retrospective cohort study of patients 55 yrs. old or younger, who had MoM hip arthroplasty for osteoarthritis. 109 procedures were performed on 90 patients with a mean follow up of 10 years. All patients were reviewed as per MHRA guidelines in planned follow-up clinics.

**Results:** Survival of implant in our cohort was 88.1% at a mean age if 10 years, with revision for any cause as an endpoint. Mean Oxford hip score was 43. Altogether, there were 12 revisions, 7 of these were for metallosis and associated symptoms. Average time to revision was 7 years. Other analysis revealed mean acetabular cup inclination angle to be 49 degrees, but no significant correlation was found between this angle and serum metal ion levels. Serum Chromium and Cobalt levels were significantly higher in revision group.

**Conclusion:** Metal on metal hip arthroplasty prime popularity time has gone. In younger population, although revision rates are higher, the surviving implants give a very good outcome in terms of patient satisfaction. Most of the patients report a desired outcome of forgotten hip.

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## P10 Primary THA

### P10-345

#### PREDICTING RISK FACTORS OF TOTAL HIP ARTHROPLASTY CONVERSION AFTER HIP ARTHROSCOPY.

##### RETROSPECTIVE REVIEW

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**Introduction/objectives:** Identify related risk factors in patient who underwent hip arthroscopy that were finally converted to Total Hip Arthroplasty (THA).

**Methods:** Retrospective study that gathered patients' demographics and conversion rate of all hip arthroscopies to THA done in our institution between June 2010 and January 2017. The group comprised 78 patients (54 men and 24 women) with a mean age of 45.21 years of age (21 to 62). X-rays were used to evaluate osteoarthritis (OA) severity according to Tönnis classification. All patients were followed for at least 11 months.

**Results:** Conversion to THA was required in 14 patients (17.94%) at a mean of 26.92 months (4 to 69) with a mean age 51.71(26 to 62). Hip OA according to Tönnis was: T1, 2 patients (5%), T2, 9 patients (50%) and T3: 3 patients (75%). No statistically significant differences were found between gender and THA incidence rate. However, the conversion rate was significantly higher in all patients aged above 50 years with Tönnis grade 2-3 (p=0.018; P<0.005).

**Conclusion:** Indications for hip arthroscopy have been rising. Nevertheless, its use in older population remains unclear. Large amount of studies have described risks factors such as age above 50 years, preoperative Harris score under 50 points or less in the modified Harris score; Tönnis grade 2-3, large chondral defects in MRI and long term history of hip disease. In our review, age above 50 years and Tönnis grade 2-3 had higher conversion rates to THA. These findings are consistent with previous published data. Determining which patients are best candidates for hip preservation remains a challenge. Further studies with long-term follow-up are needed to properly ascertain which factors will determine successful outcomes after hip arthroscopy.

## P10 Primary THA

### P10-295

#### MID TERM RESULTS OF A CONTEMPORARY STEM CLINICAL AND RADIOLOGICAL RESULTS AT 7 YEARS

##### MINIMUM FOLLOW UP

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**Introduction/objectives:** Uncemented stems won popularity in last decades. Different companies with diverse design philosophies reported consistent good results. The aim of this study was to analyze the mid-term clinical and radiological results of a single brand tapered full hydroxyapatite stem with a minimum 7 years follow up.

**Methods:** 104 patients(49 females/55 males)with 110 total hip replacement. Mean age at surgery 56.8 years (range 42-75 years). Mean follow-up 88.4 months. Tumoral or MTS disease, fractures, over 75years old patients were excluded. All patients received an Element Stem (Exactech). Posterolateral approach was used with pififormis tendon retention. Follow up 3 weeks,3 and 6 months,1 year and yearly Harris hip score (HHS) and Merle Postel D Aubigne score (MPD) recorded on each visits. Radiographic evaluation postop and at controls. Complications were recorded.

**Results:** All patients classified as poor according to MPD score. Mean postop improvement 6.8 points. HHS average 47.3 points preop and 93.1 points at last follow up. Clinical results: 89 cases (81%) excellent, good 11 patients (10%) , satisfactory in 7 cases (6.3%) and poor 3 cases (2.7%). Poor results related to complications: trochanteric fracture 1 case and 2 proximal calcarfractures. No septic loosening was detected. No anterior femoral pain was referred by patients. RX showed osteointegration in all cases. Subsidence detected on 6 cases (5.5%)during the first 3 months, mean 1,2mm; with no clinical manifestation or progression. 1 case had multiple dislocations at 6 years postop due to Alzheimer. No patient was lost from follow up.

**Conclusion:** Our midterm outcomes are promising with excellent and good clinical results, and patient satisfaction; the risk of aseptic loosening appear to be minimal or absent with this type of stem design.

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## P10 Primary THA

### P10-39

HIGH FREQUENT OF RADIOLOGUCENCY WITH TRABECULAR METAL PRIMARY ACETABULAR COMPONENT IN SHORT TERM FOLLOW UP.

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**Introduction/objectives:** Trabecular metal (TM) component is a novel ultraporous metal substrate with a higher coefficient of friction to enhance interference fit and with ultraporous surfaces to enhance osseointegration. The aim of this study was to investigate bone reaction around the TM cup in the short term.

**Methods:** This case series study included 50 Japanese patients (53 hips) who underwent a primary total hip arthroplasty with a Continuum acetabular component. The subjects consisted of 15 men and 35 women with a mean age of 70 years. The mean observation period was 41 months (range, 25-53 months). All the components were implanted by using the press-fit technique after under-reaming of 1 mm, guided by a computed tomography-based navigation system. Radiographic evaluation included spot welds (SW), a radiolucent line (RLL), gap filling, and bone grafting on the lateral edge of the component at 1 year after surgery.

**Results:** No evidence of loosening appeared in all the components. One-year radiography revealed good osseointegration; thus, SW was obtained in all the components (80% in DeLee zone 1, 68% in zone 2, and 20% in zone 3). On the other hand, a RLL with a sclerotic line appeared in 54% of the cases (8% in zone 1, 38% in zone 2, and 44% in zone 3). None of the cases presented RLL in all the 3 zones. All the initial gaps in the 9 cases were filled with new bone. Morselized bone was grafted in 34 cases that were all well harvested (re-trabecular), and 13 cases (38%) had a RLL with a sclerotic line.

**Conclusion:** Although the TM acetabular component presented excellent osseointegration, radiolucency appeared with high frequency. We assumed that an extremely rigid initial fit by the rim with a high coefficient of friction might lead to a heterogeneous fixation.

## P10 Primary THA

### P10-7

INFLUENCE OF PROXIMAL FEMUR MORPHOLOGY ON FIXATION OF TAPERED WEDGE FEMORAL STEM IN TOTAL HIP ARTHROPLASTY.

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**Introduction/objectives:** We often encountered cases showing poor congruence to the shape of the femoral canal with the tapered wedge femoral stem (TW). The aim of this study was to reveal the influence of proximal femur morphology on the fixation of TW in total hip arthroplasty (THA).

**Methods:** This case series study included 70 Japanese patients (76 hips) who underwent a THA with a TW. Computed tomography (CT) image obtained before surgery was reconstructed to obtain a coronal plane image. In the coronal plane, inclination in four sites of the proximal femur were measured as follows: medial cortex from the apex of the lesser trochanter to 15 mm proximal (M1), lateral cortex from the apex of the lesser trochanter to 15 mm proximal (L1), medial cortex from the apex of the lesser trochanter to 30 mm distal (M2), lateral cortex from the level on the apex of the lesser trochanter to 30 mm distal (L2). The fixation pattern of the femoral stem was investigated on CT after surgery. Mann-Whitney U test was used for statistical analysis.

**Results:** Inclination of the proximal femur were as follows (mean  $\pm$  SD): M1,  $25.3 \pm 4.1^\circ$ , M2:  $9.5^\circ \pm 2.1^\circ$ , and L1:  $20.8^\circ \pm 3.4^\circ$ , L2:  $8.9^\circ \pm 2.5^\circ$ . Eighteen stems (33%) were fixed in the proximal medial portion and distal lateral of porous coated zone (ML fit); 33 (60%), in the distal porous coated zone (flare fit); and 4 (7%), in the anterior and posterior areas in the sagittal plane. M1 and M2 were smaller, and L2 was larger in the ML fit group than in the flare fit group ( $p < 0.05$ ).

**Conclusion:** As the fixation pattern could be affected by the shapes of the proximal femur, an adequately designed femoral stem should adopted depending on the case to achieve better fixation.

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## P10 Primary THA

### P10-196

POST-OPERATIVE RADIOLOGICAL ANALYSIS OF TOTAL HIP REPLACEMENTS AT A NON-PROFIT SURGICAL CENTRE IN CAMBODIA

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**Introduction/objectives:** To evaluate postoperative radiographs at a Cambodian surgical centre (CSC) following primary total hip replacement (THR) between 2007 and 2017 by visiting foreign surgeons and local surgeons supervised by foreign surgeons. Additionally looking at THRs conducted by local surgeons unsupervised pre and post 2015 to assess progression over time.

**Methods:** Data from digitised AP pelvic radiographs was extracted using ImageJ software for leg length discrepancy, vertical centre of rotation, horizontal centre of rotation discrepancy (HCORD), acetabular inclination, femoral stem positioning and cement mantle thickness. There were four strata: foreign led (FL), early supervised, early unsupervised (EU) and late unsupervised (LU). Analysis of means was conducted using univariate ANOVA and Sheffe's test. Studies have shown optimal HCORD to be  $< 5$  mm.

**Results:** 51 radiographs were analysed. The EU group had a significantly greater HCORD compared to the FL group (2.20 mm (95% CI: 0.48 - 3.92 %) vs 5.67 mm (95% CI: 4.29 - 7.05 %) ( $p = 0.027$ )). There was a significantly improved HCORD in the LU group compared to the EU group (5.67 vs 2.95 mm (95% CI: 1.74 - 4.17%) ( $p < 0.05$ )). There was no difference between the groups in the other parameters.

**Conclusion:** CSC has successfully established a self-sustainable THR service in Cambodia. Optimal positioning of implanted components is essential to providing successful patient outcomes and there is strong evidence of local surgeons improving their performance with time and training from visiting foreign surgeons. In the majority of parameters, local surgeons were performing to a similar standard as visiting surgeons. As such CSC serves as an example of what is possible for hospitals in other low and middle income countries.

## P10 Primary THA

### P10-177

TITANIUM SPRAY COATED MONOBLOCK RM VITAMYS ACETABULUM. EXCELLENT MID-TERM RESULTS IN 75 PATIENTS

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**Introduction/objectives:** There is limited evidence of mid-term results for RM Pressfit vitamys in the literature. The aim of our study was to prospectively evaluate the mid-term survival of this implant, in all consecutive cases operated in our centre

**Methods:** Data were extracted for the Arthroplasty Registry Thessaloniki (ART). 75 consecutive non-selected primary total hip arthroplasties using the RM® Press-fit cup were included in the study. They have been performed on our department between February 2010 and June 2017. The patients were evaluated clinically and radiologically. Demographic data, pre/postoperative visual analogue scale (VAS) for pain and satisfaction, Harris Hip Scores (HHS) and complications were recorded.

**Results:** Our cohort comprised of 48 women and 27 men with a mean age of 58 (+/-2.5) years. The mean body mass index was 26.8 kg/m<sup>2</sup> (+/- 4.6). 60 patients suffered from primary osteoarthritis and 15 from avascular necrosis. We used a mini posterior approach and ceramic heads for all the patients. 3 surgeons were involved. Patients were followed for a mean of 4.2 (+/- 2.1) years. The radiographic analysis showed neither progressive radiolucency nor osteolysis. There were no intraoperative or postoperative complications. There were significant improvements in the Harris hip pain and function scores and VAS score after surgery. The mean HHS score increased from 44.9 (+/- 8.2) preoperatively and 93.6 (+/- 5.2) postoperatively at five years. The survival rate was 100% at 5 years with revision due to aseptic loosening of the cup as the endpoint.

**Conclusion:** Our study demonstrated excellent mid-term results of the RM Press-fit Vitamys cup. Despite these encouraging results we need long-terms studies to confirm our findings

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## P10 Primary THA

### P10-564

PRIMARY HIP SURGERY: OPERATION WALK IRELAND, HANOI 2018, VIETNAM  
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**Introduction/objectives:** Operation Walk is an international charity which performs total joint arthroplasty (THA) in third-world countries where these life changing operations are not available. It was founded in 1996 by Dr Larry Dorr in Los Angeles and has expanded to form 15 separate chapters in North America. The first international chapter was formed by our senior author in 2016.

**Methods:** In March 2017 Operation Walk Ireland sent a team of 60 volunteers to Hospital 108, Hanoi, Vietnam. Following a very successful mission, we sent a second mission back to Hanoi in 2018, to perform THA on patients who would otherwise never receive treatment for debilitating osteoarthritis. We highlight salient differences between respective patient cohorts.

**Results:** We performed 55 THA over 4 days. When we compare the 38 THR to those most recently performed by our senior-author, we find some stark contrasts. In Ireland mean age is 62.2 [M: 63.4, F: 60.1] whereas in Vietnam the mean age is over 13 years younger at 48.7 [M: 49.9, F: 43.3]. Secondly, in Ireland the diagnosis is primarily Osteoarthritis (OA) whereas in Vietnam 65% of THA patients are due to Avascular Necrosis (AVN). Finally, the average shell/stem size in Ireland was 53/6 [M: 55/7; F: 51/3], whereas this is reduced by 2 sizes to 51/4 [M: 52/5; F: 49/2] in Vietnam.

**Conclusion:** Hanoi 2018 was the second mission that Operation Walk Ireland has sent to Vietnam. We learnt many lessons during our first charity mission in 2017. Teaching as an essential priority and this was reflected in surgical, anaesthetic, ward and physiotherapy teams. Patient characteristics are significantly different from the cohorts with which we are familiar. We note that the Vietnamese BMI of 21.1 is over 7 points less than a typical Irish THA cohort (28.4).

## P10 Primary THA

### P10-239

COMPLICATIONS AND PREDICTIVE FACTORS OF MORBIDITY AND MORTALITY IN PATIENTS UNDERGOING SIMULTANEOUS BILATERAL VERSUS MONOLATERAL TOTAL HIP ARTHROPLASTY. A RETROSPECTIVE CASE-CONTROL STUDY.  
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**Introduction/objectives:** Simultaneous bilateral total hip arthroplasty (THA) could be associated with a 30-day mortality increase compared to monolateral THA. We aimed to compare the rate of complications associated with bilateral and monolateral THA, and to identify predictors of morbidity and mortality in patients undergoing bilateral THA.

**Methods:** We included patients undergoing simultaneous bilateral THA (G1) between January 2015 and December 2016. The control group included patients undergoing monolateral THA (G2) matched for gender, age and ASA score. The collected data were: body mass index (BMI), comorbidities, preoperative anticoagulant/antiplatelet therapy, preoperative and 1st postoperative day hemoglobin (HB) and hematocrit (HTC), transfusions, intra- and postoperative complications, readmission or reintervention at 30 days.

**Results:** The G1 included 279 patients (M:F=171:108) and the G2 521 (M:F=316:205). The average age was 55 years. No cases of intraoperative complications, deep vein thrombosis, pulmonary embolism and death were found. No significant difference was found in terms of rate of fractures, dislocations and infections. The mean decrease in HB and HTC was 3.8 mg/L and 11.6% in G1, and 2.6 mg/L and 8.1% in G2 (P<0.001). The rate of transfusions was 37.3% in G1 and 6.5% in G2 (P<0.001). No significant difference was found in terms of readmissions or reinterventions at 30 days. Risk factors for postoperative anemia were preoperative anemia (P<0.001) and bilateral THA procedure (P<0.001) while BMI and male gender were protective factors.

**Conclusion:** Simultaneous bilateral THA does not lead to an increased risk of intra- and postoperative complications or to hospital readmission or reintervention at 30 days, but it is a risk factor for postoperative anemia.

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## P10 Primary THA

### P10-574

HIGH IMPACT AND LORD SPORTS ACTIVITY AFTER TOTAL HIP ARTHROPLASTY  
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**Introduction/objectives:** There is no consensus what kind of sports are preferred activity after receiving total hip arthroplasty. It's generally accepted low impact sports just like walking and swimming and golfing. But increasing the number of total hip arthroplasty and the demands of good activity of daily living after surgery, some patients do high impact and high load sports. Retrospective study was carried out who continues high impact sports activity after total hip arthroplasty.

**Methods:** 22 patient (29 joints) were evaluated retrospectively. Demographic data, Japanese Orthopaedic Association Score (JOA score), pre/post-operative range of motion and VAS for satisfaction in sports activity. Radiographic analysis was also recorded bone reaction and loosening.

**Results:** Mean follow up period were 2.41 years. Post-operative JOA score increased to 96 points (MAX 100 point). Average range of motion of Flexion, Extension, Abduction, Adduction, External rotation, internal rotation were 108.9, 6.09, 35.43, 24.35, 42.61, 31.3. Mean VAS increased to 8.7 (MAX 10 points). 9 patients returned to jogging, 3 patients returned to Classic ballet and Kendo. Other high impact sports were Rugby and football, snowboarding, aerobics and Karate. No implants loosening and osteolysis were seen.

**Conclusion:** The patients who returned to do high impacts sports keep good range of motion and satisfaction for the activity. In this moment, there is no loosening and breakage of implants. But these results are short term, further observation is needed.

## P10 Primary THA

### P10-485

UP TO 10 YEARS FOLLOW-UP OF 870 THR WITH CERAMIC-ON-CERAMIC BEARING A RETROSPECTIVE SINGLE CENTRE STUDY  
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**Introduction/objectives:** Nowadays, over 10 million people around the world were treated with a ceramic component. Ceramic on ceramic bearing was first introduced more than 40 years ago. Advantages of CoC bearings are no allergic reaction and low wear debris. The aim of this retrospective study was the clinical evaluation of ceramic on ceramic bearing, which was in use since 2005 at the Department of Orthopaedic Surgery, Medical University of Graz.

**Methods:** 798 patients, 378 men and 420 women, were included in this retrospective study. Within this collective, 870 ceramic on ceramic bearings in combination with a Corail® stem and Pinnacle® cup were implanted. In 83 % (n=721), a 36 mm head was used, in 11 % (n=94) a 32 mm head and a 28 mm head was used in 6 % (n=64). The mean postoperative radiological follow-up of all patients together was 44 months (range, 3-126 months). The assessment of the radiographs included sign of stress shielding, osteolysis, heterotopic ossification, bone resorption rated in Gruen zones and the implant position.

**Results:** Signs of stress shielding associated with the stem were found in 7 cases. Heterotopic ossification was observed in 46 patients and clinically irrelevant radiographic loosening lines in 120 cases. Revisions due to impingement and subluxation had to be done two cases, due to Luxation in one case and early infection in one case. An inlay fracture occurred in 3 cases. 48 patients died during the time of observation.

**Conclusion:** The results of our study showed excellent clinical results and minimal risk for aseptic loosening of the Corail® stem compared with international registry data, such as Australia, New Zealand, Denmark and England, where an implant survival for the Corail® stem was reported from 97% to 99% after a follow-up up to 15 years.

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## P10 Primary THA

### P10-301

TOTAL HIP ARTHROPLASTY UTILIZING AN UNCEMENTED, FLAT, TAPERED STEM WITH A REDUCED DISTAL PROFILE

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**Introduction/objectives:** The aim of this retrospective study was to analyze the mid-term results of total hip arthroplasty (THA) utilizing a never before reported on uncemented, flat, tapered stem with a reduced distal profile in patients who had been followed for a minimum of five years.

**Methods:** Two hundred and twenty-eight consecutive THAs in 211 patients were performed between 2007 and 2009, by a single surgeon, utilizing a stem with a reduced distal profile (ANTHOLGY, Smith&Nephew). Femoral and/or acetabular component revision was determined for all hips. Kaplan Meier was used to analyze implant survival. Preoperative and follow-up modified Harris Hip Scores (mHHS) were obtained for living patients and analyzed using Wilcoxon signed-rank test ( $p < 0.05$  level of significance).

**Results:** At a median of 8.4 (7.1 - 9.3) years there was 92% follow-up with 16 patients (18 hips) lost to follow-up. Six hips were revised, one femoral component revision for aseptic loosening, and the others acetabular revisions for instability ( $n=3$ ), dislocation ( $n=1$ ), squeaking ( $n=1$ ). At 10.7 years Kaplan Meier curves were 96.3% for all-cause revision and 99% for femoral component revision only. Of the 22 patients (22 hips) who had died, all had retained their hips and died from co-morbidities. In living patients who had not undergone revision, there was a significant improvement in the median mHHS from 58.3 (49.5 - 64.9) points preoperatively to 95.7 (90.2 - 100) points at the time of latest follow-up ( $p < .0001$ ).

**Conclusion:** Primary THA utilizing an uncemented, flat, tapered stem with a reduced distal profile had high implant survivorship at a minimum follow-up of 5 years and was associated with a significant improvement in a patient-reported outcome measure.

## P10 Primary THA

### P10-408

IS THERE A DIFFERENCE IN CUP INCLINATION ON THE RIGHT AND LEFT SIDES AFTER BILATERAL SIMULTANEOUS TOTAL HIP ARTHROPLASTY BY DIRECT ANTERIOR APPROACH: A RADIOGRAPHIC ASSESSMENT

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**Introduction/objectives:** Simultaneous bilateral total hip arthroplasty (THA) has shown good outcomes and due to the supine position of the patient, the direct anterior approach (DAA) facilitates this operation. The aim of this study was to compare cup inclination between the right and left sides after bilateral simultaneous total hip arthroplasty by direct anterior approach without intraoperative fluoroscopy guidance in postoperative anteroposterior pelvic radiographies

**Methods:** All simultaneous bilateral THA which were performed between 2013 and 2017 by the orthopedic department of Imam Khomeini Hospital, Tehran University of Medical Sciences by DAA were included. Postoperative anteroposterior pelvic radiographies of patients were examined with a digital software. The angle of cup abduction in both sides was measured and compared. The sequence of surgery (starting with right side vs left side) was also considered

**Results:** A total of 101 simultaneous bilateral THA were performed by DAA (71 male and 30 female patients) with a mean age of 51 years. Mean cup abduction angle was 46.5 on the right side and 48.2 on the left side with no significant difference ( $p$ -value=0.1). In subgroup analysis, there was no difference in mean cup abduction angle regarding patients age and gender

**Conclusion:** One-stage bilateral THA is a safe procedure with equally acceptable cup abduction angle on both sides regardless of sequence of side of surgery and patient's age and gender

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## P10 Primary THA

### P10-208

MID-TERM CLINICAL AND RADIOGRAPHIC OUTCOME OF ANTEROLATERAL HIP SURFACE ARTHROPLASTY

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**Case Study:** Objectives. Hip surface arthroplasty is usually performed using a posterior approach, but some studies cautioned against the posterolateral capsulectomy compromising the femoral head-neck blood supply. Only a few preliminary outcomes of resurfacing arthroplasty through alternative approaches have been reported. This study evaluates retrospectively the mid-term clinical and radiographic results of modern metal-on-metal hip resurfacing performed through an anterolateral Watson-Jones approach.

**Methods:** Fifty-seven hips in 52 patients received Conserve® Plus surface prosthesis because of degenerative arthritis. Two patients died of unrelated causes, leaving 55 hips in 35 males (3 bilateral) and 15 females (2 bilateral), with a mean age of 56 years (range, 27-70). Clinical and radiographic evaluation was available for all cases at an average follow-up of 5.2 years (range, 2-9.2).

**Results:** Two hip replacements in the same patient were successfully converted to conventional arthroplasty because of early aseptic loosening of the acetabular cup. The mean Harris hip score improved significantly from 59.8 points preoperatively to 93.7 points at the latest follow-up. An average neck narrowing of 3.27%, never exceeding 10%, was measured. Progressive periprosthetic radiolucencies and osteolysis were not observed. The cumulative survival rate at 9.2 years with revision for any reason as the end point was 93.0%.

**Conclusions:** Mid-term clinical and radiographic outcome of current generation metal-on-metal hip surface arthroplasty performed through an anterolateral approach is encouraging, but longer-term follow-up studies are required. A strict patient selection is critical to reduce the risk of complications and prevent early failure.

## P10 Primary THA

### P10-230

COMPARISON OF CLINICAL OUTCOMES WITHIN PERIOPERATIVE PERIOD BETWEEN MOBILE-BEARINGS AND FIXED-BEARINGS IN TOTAL HIP ARTHROPLASTY - A RETROSPECTIVE COMPARATIVE COHORT STUDY

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**Introduction/objectives:** The objective of this study was to assess the clinical outcomes within perioperative period between mobile-bearings (MB) and fixed-bearings (FB) in hip arthroplasty in terms of dislocation after control of disturbing variables.

**Methods:** 188 patients who underwent total hip arthroplasty with mobile-bearing ( $n=124$ ) and fixed-bearing ( $n=64$ ) treated for femoral neck fractures were included. After propensity score matching for age, gender, ASA score, BMD, BMI, Charlson comorbidity score index, and preoperative Koval's grade, 40 pairs of each THA-MB and THA-FB including 20 males and 20 females with mean age of 80.6 years and 79.4 years respectively were identified. The mortality rate, perioperative parameters, dislocation rate, surgical and medical complication, Harris Hip Score (HHS) and postoperative ambulatory status of either group were assessed retrospectively.

**Results:** There was no significant difference in 1 year-mortality, surgery-related complication, the requirement of ICU care, operation time, blood loss, the amount of transfusion, and reoperation. The HHS score ( $p=0.004$ ), postoperative Koval's grade ( $p=0.0004$ ) were increased in the group of THA-MB and the medical complication was observed highly in the group of THA-FB ( $p=0.013$ ). Moreover, the dislocation rates in both the groups were similar ( $p=0.188$ ).

**Conclusion:** Although THA-MB group had negative outcomes with respect to some perioperative parameters compared to THA-FB, there was no significant difference in the 1 year-mortality and reoperation. The dislocation rate of THA-FB was comparable to those receiving THA-MB. High values of HHS in THA-MB group were associated with better postoperative ambulatory status.

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## P10 Primary THA

### P10-125

#### EARLY INFLAMMATORY RESPONSE AND HAEMOGLOBIN LEVEL AFTER TOTAL HIP REPLACEMENT ACCORDING TO THE FIXATION METHOD AND TYPE OF STEM

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**Introduction/objectives:** Total hip replacement (THR) results in an inflammatory response of varying degree. This is associated to postoperative recovery and further complications. The aim was to compare the postoperative curves of C-reactive protein (CRP), erythrocytation (ESR) and hemoglobin (Hb) to assess the early inflammatory response among a group of patients with cementless standard THR, hybrid fixation, and short stems.

**Methods:** 504 patients, with unilateral uncomplicated THR were selected. Blood samples were collected in the preoperative and prospective stage at 7, 10, 17 and 24 days. 3 groups, each one with the same implant were included, uncemented flat tapered standard stem n=100 (19,84%), uncemented partial neck preserving short stem n=96 (19,05%), and hybrid fixation with polished cemented tapered stem, n=308 (61,1%)  
Operative time in minutes, BMI, ASA score and length of hospital stay were determined

**Results:** There were no significant differences in the pre- and postoperative background variables among the groups. An increase was observed in the mean values of ESR in the hybrid fixation (18,4 sd 12) during the first 4 weeks (short stem ESR 16 sd 9; standard stem ESR 15 sd 9) without reflecting significant difference. The Hb values had similar behavior in all groups, the average hemoglobin descended from 13.9 to 11.6 g% (p <0.01). Regarding surgery time was observed: (short stem 105 min sd 21min vs uncemented flat tapered standard stem 115min sd 23 min vs hybrid fixation 123 min sd 26 min; p = 0.02)

**Conclusion:** In a group of patients with similar demographic characteristics there were no differences in the early inflammatory response and decrease in hemoglobin values in relation to hybrid fixation, not cemented with standard stem or not cemented with short stem.

## P10 Primary THA

### P10-122

#### NO DECLINE IN HIGH PATIENT SATISFACTION AFTER TOTAL HIP ARTHROPLASTY AT LONG-TERM FOLLOW-UP

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**Introduction/objectives:** Patient satisfaction is gaining popularity as an important outcome parameter in today's health care system and in particular in evaluating the outcome of joint arthroplasty. Commonly used clinical outcome parameters after total hip arthroplasty (THA) remain good at long-term follow-up, however, whether this also accounts for patient satisfaction remains unclear. This study presents a prospective follow-up of patient satisfaction after THA and a possible correlation with common outcome parameters was established.

**Methods:** Patient satisfaction was repeatedly measured with a visual analogue scale (VAS) after a mean follow-up of 13.5 (12.6-14.2) years in a prospective cohort of 147 patients (153 THAs). In addition, the results were compared with a mean follow-up of 2.5 years after THA.

**Results:** At a follow-up of 13.5 years the median VAS for satisfaction was 95 (26-100) compared to a median VAS satisfaction of 98 (0-100) at earlier follow-up (p=0.781). Overall, the clinical outcome parameters also remained good at long-term follow-up without significant changes. However, a rather low correlation with VAS satisfaction was encountered. Pain during activity showed the highest correlation (-0.686) with VAS satisfaction.

**Conclusion:** Patient satisfaction after THA remains high after prolonged follow-up. Apparently patients do not get used to the successful results of their THA. A rather low correlation with common clinical outcome parameters suggests that patient satisfaction is a separate entity. Since patient satisfaction correlated best with pain during activity, this is probably the most important aspect in patient satisfaction. Measurement of patient satisfaction has additional value and may even replace some of the more commonly used questionnaires.

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## P10 Primary THA

### P10-307

#### PREOPERATIVE AND INTRAOPERATIVE ERROR LEAD TO ACETABULAR CUP MALALIGNMENT IN LATERAL POSITION

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**Introduction/objectives:** Dislocation after total hip arthroplasty (THA) is one of serious major complication and is frequently caused by malpositioning of the acetabular component.

**Methods:** A prospective cohort study in patients who underwent THA in lateral decubitus position with imageless computer-assisted navigation. Demographic data instruments, were collected. Preoperative and Intraoperative errors were detected and corrected by fluoroscopy and computer navigation, respectively. After lateral decubitus setting, preoperative setting error was detected and correct with fluoroscopy by surgical bed tilting. After acetabular cup was implanted with manual guide technique, computer-assisted navigation was applied to identify deviated degree of cup position from desired position (40o inclination and 10o anteversion). Intraoperative motion error was different final cup position on navigation monitor from preoperative error.

**Results:** Result :In total 70 patients, the mean absolute value preoperative errors detected and corrected with table adjustment under fluoroscopy in the coronal, transverse, and sagittal planes were 2.72° (SD, 1.69°), 3.40° (SD, 2.30°), and 5.55° (SD, 2.88°), respectively. Intraoperative errors of inclination and anteversion that detected and corrected with imageless computer navigation were 2.85° (SD,2.08°) and 5.09° (SD,3.04°) respectively.

**Conclusion:** Conclusion: Preoperative and intraoperative errors of inclination and anteversion of acetabular cup positioning could contribute to malpositioning of the acetabular component. (Preoperative lateral setting and intraoperative motion error were found in lateral decubitus position setting especially in sagittal plane that leads error in anteversion.)

## P10 Primary THA

### P10-522

#### HIP ARTHROPLASTY USING THE CEMENTLESS ML TAPER® STEM AT A MINIMUM 5-YEAR FOLLOW UP.

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<sup>(1)</sup> HTO Dona Lindu, Rio de Janeiro, Brazil

**Introduction/objectives:** The objective of this study is to present clinical and X-ray outcomes with the use of ML Taper® cementless stem with 5.6 years of mean follow-up.

**Methods:** This single-center, retrospective study included 275 patients (308 hips), who underwent primary total hip arthroplasty, between July 2010 and July 2012, in which a ML Taper cementless stem was implanted using a posterolateral approach. During that period, ten patients missed follow-up; thus, they were not included in the study. The femoral component of the ML Taper® stem is made of titanium (Ti-6Al-4V), with reduced neck geometry and a minimized lateral shoulder. The Merle d'Aubigné score was collected. Radiographs were evaluated for bone-implant fixation, bone remodeling, and osteolysis.

**Results:** The sample was distributed as 149 male and 126 female, with mean age of 58,3 years(26-88). On the clinical results analysis, we found 258 hips with very good and good results, and 17 hips with medium and poor results. 35 complications were recorded at the last follow-up. There were 4 dislocations, 1 calcar fracture, 1 case of sciatic nerve palsy, 4 deep infections, 2 TVP and 22 leg length discrepancy > 10 mm which in all but one did not change clinical outcomes. Our worst clinical results were 2 deep infections submitted to 2 stages revision and 1 discrepancy of 2.6 cm. Postoperative radiographs revealed satisfactory position and alignment of components with no radiolucencies observed in all patients with no evidence of osteolysis, distal hypertrophy, or pedestal formation.

**Conclusion:** This study demonstrates that ML Taper cementless stem can provide successful outcomes at 5-year follow-up with good clinical results and high degree of implant fixation.

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## P10 Primary THA

### P10-128

SAME-DAY BILATERAL TOTAL HIP ARTHROPLASTY WITH THE DIRECT ANTERIOR AND THE POSTERIOR APPROACH: A COMPARISON OF OUTCOMES

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**Introduction/objectives:** To compare different characteristics as well as in-hospital charges between patients undergoing same-day bilateral total hip arthroplasty (SDBTHA) with the direct anterior (DAA) or the posterior approach (PA).

**Methods:** We retrospectively reviewed clinical characteristics of patients treated with DAA or PA SDBTHA between 1/2010 and 12/2015. We documented demographics, comorbidities, length of stay (LOS), total/allogenic transfusion rates, in-hospital complications, discharge disposition, 90-day mortality and readmission rates, and hospital charges. Univariate analyses for differences among groups were conducted using Wilcoxon rank-sum test for continuous, and Chi-square or Fisher's exact test for categorical variables. Significance level was set at 0.05.

**Results:** A total of 257 patients were included (115 men, 142 women; mean age 55.6±12.4 years). The DAA and the PA groups included 87 and 170 patients, respectively. The groups were similar in age (p=0.59), Deyo-Charlson comorbidity index (p=0.98), and female gender (p=0.56). Procedure (p<0.001) and OR times (p<0.001), as well as LOS (p<0.001) were lower in the DAA group. The DAA cohort was more likely to be discharged home (p=0.023). Ninety-day mortality and readmission for revision were both 0% for either group. No difference was found in local (p=1.0), minor systemic (p=0.67) and major systemic (p=1.0) complications. Blood transfusions of any type (p=0.53) and allogenic blood transfusion rates (p=0.97) were similar between groups. Total in-hospital charges were significantly lower for the DAA group (p=0.005).

**Conclusion:** The DAA is a safe alternative to the PA for SDBTHA with respect to patient's safety, as well as the hospital and surgeon's burden.

## P10 Primary THA

### P10-450

RISK FACTORS FOR INCREASED SAGITTAL PELVIC ROTATION IN PATIENTS REQUIRING THR

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**Introduction/objectives:** The aim of this study was to investigate how gender, age and lumbar degenerative disease affect the number of patients at risk of excessive sagittal pelvic rotation.

**Methods:** Pre-operatively, 3428 patients had their pelvic tilt (PT) and lumbar lordotic angle (LLA) measured in three positions; supine, standing and flexed-seated, as part of routine planning for THR. The pelvic rotation from supine-to-standing and from supine-to-seated was determined from the difference in pelvic tilt measurements between positions. Lumbar flexion was determined as the difference between LLA standing and LLA when flexed-seated. Patients were stratified into groups based upon age, gender and lumbar flexion. The percentage of patients in each group with excessive pelvic rotation, defined by rotation >13° in a detrimental direction, was determined.

**Results:** Posterior pelvic rotation from supine-to-stand increased with age and decreasing lumbar flexion. This was more pronounced in females. Similarly, anterior pelvic rotation from supine-to-flex seated increased with age and decreasing lumbar flexion. This was more pronounced in males. Notably, 30% of elderly females had excessive pelvic rotation. Furthermore, 38% of patients with lumbar flexion <20° had excessive pelvic rotation.

**Conclusion:** Excessive pelvic rotation was more common in older patients and in patients with limited lumbar flexion. This might be a reason for the increased dislocation rate in the elderly population. A more constrained bearing might be a more viable option in patients with limited lumbar flexion (<20°), which constitutes 5% of the THR population. The large range of pelvic rotation in each group supports individual analysis on all patients undergoing THR.

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## P10 Primary THA

### P10-585

PREDICTORS OF PHYSICAL FUNCTIONING AFTER PRIMARY UNCEMENTED TOTAL HIP ARTHROPLASTY

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**Introduction/objectives:** While total hip arthroplasty (THA) is often successful, about 30% of patients report limitations in physical functioning two year after surgery. This study aims to define which baseline characteristics that have reported associations with functional outcome are important predictors of physical function in patients who underwent THA.

**Methods:** We first performed a systematic literature review to identify patient characteristics with known or suspected associations with physical function after THA. Then, we used backward linear regression to assess which of these pre-operative characteristics actually predicted physical function in our population of 150 patients who participated in a multicenter RCT. Physical function was quantified as Hip disability and Osteoarthritis Outcome Score Physical function Short form (HOOS-PS) scores at one year follow up. No difference in HOOS-PS scores were observed between randomization groups (Zweimuller vs. CFP stem), so the prediction model was built for the complete study population.

**Results:** The systematic review resulted in strong evidence for BMI, age, comorbidity, mental health and pre-operative physical function as predictors for post-operative physical function. The strongest predictors in the RCT population were mental health (p=0.152), pulmonary comorbidity (p=0.091), and pre-operative physical functioning (p<0.001).

**Conclusion:** Based on both literature and a clinical prediction model, pulmonary comorbidity, pre-operative physical functioning and mental health were important predictors of physical functioning 1 year after a THA. These findings are valuable for managing patient expectations and improving functional outcome after THA.

## P10 Primary THA

### P10-317

COMPARATIVE ANALYSIS OF CEMENTED AND CEMENTLESS ARTHROPLASTY TECHNIQUES.

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**Introduction/objectives:** The question of using cemented or cementless techniques for total hip replacement (THR) is controversial at present. However, most countries refused cemented arthroplasty in favour of cementless. Objective is to perform a comparative analysis of the results of cemented and cementless THR according to revision arthroplasty of patients with aseptic loosening of components.

**Methods:** We conducted a retrospective controlled study included analysis of the 536 case histories with aseptic loosening of the components carried out from January 1, 2014 to December 31, 2017. In 1 group were included 302 cases after cementless THR. The 2 group included 234 cases of cemented THR.

**Results:** The average time from the primary THR to the revision in 1 group was 8.3 ± 1.2 years, in 2 group - 5.1 ± 1.5 years (p<0.05). The distribution of bone defects according to Paprosky: 1 type: 1 group - 31 (10.3%), 2 group - 9 (3.8%); 2A type: 1 group - 78 (25.8%), 2 group - 36 (15.4%); 2B type: 1 group - 96 (31.8%), 2 group - 58 (24.8%); 2C type: 1 group - 47 (15.6%), 2 group - 62 (26.5%); 3A type: 1 group - 39 (12.9%), 2 group - 41 (17.5%); 3B type: 1 group - 11 (3.6%), 2 group - 28 (12%). Using of bone auto- and allografts, tantalum augments in 1 group were performed in 97 cases (32.1%), in 2 group - 131 cases (56%). Antiprotrosion cages in 1 group were used in 77 cases (25.5%), in 2 group - 99 (42.3%). Impossibility of components implantation due to huge bone defects in 1 group were in 5 cases (1.7%), in 2 group - 9 cases (3.8%).

**Conclusion:** Reducing the time from primary THR to revision surgery, significant bone defects, necessity of more expensive metal components implantation during revision surgery in future allowed us to say about of limitation indications for cemented THR.

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## P10 Primary THA

### P10-11

#### SEQUENTIAL BILATERAL TOTAL HIP ARTHROPLASTY THROUGH A MINIMALLY INVASIVE ANTERIOR APPROACH IS SAFE TO PERFORM

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**Introduction/objectives:** Sequential bilateral total hip arthroplasty (THA) has the potential advantages of a single operative intervention with a single hospital stay, alongside reduced costs and total rehabilitation times. Its use has been limited, however, by a theoretical increase in perioperative complications.

The objective of this study was to assess functional outcomes and complications in patients undergoing sequential bilateral THA performed using anterior minimally invasive surgery (AMIS).

**Methods:** Two surgical centres conducted a retrospective observational analysis of 130 patients (77 females) with a mean age of 57 (range, 35-77) years, all of whom were treated by one surgeon and followed up for 24 months.

**Results:** The mean length of hospital stay length was 8.4 (range, 6-18) days. The mean operative time was 162 (range, 92-185) minutes, the mean intraoperative blood loss was 499.1ml, and the mean preoperative and postoperative haemoglobin levels were 14.3 g/dl and 11.3 g/dl, respectively. No perioperative complications or deaths were recorded. The Harris Hip Score (HHS) improved from 44.5 ±13.7 preoperatively to 98.9 ± 1.0 at final follow-up. The High Activity Arthroplasty Score (HAAS) improved from 7.7 ± 2.3 preoperatively to 14.4 ± 1.0 after 24 months. The Questions on Life Satisfaction (FLZ) score improved from 58.2 ± 6.7 to 68.8 ± 5.2, while the health FLZ improved from 60.1 ± 6.0 to 71.0 ± 4.7.

**Conclusion:** This retrospective analysis suggests that, in selected patients, sequential bilateral THA via an anterior minimally invasive approach appears to be a valid alternative to two-stage bilateral THA.

## P10 Primary THA

### P10-71

#### USE OF A DIGITAL PROTRACTOR AND A SPIRIT LEVEL TO DETERMINE THE INTRAOPERATIVE ANTEVERSION OF FEMORAL COMPONENT DURING HIP HEMI-ARTHROPLASTY: A PROSPECTIVE CLINICAL TRIAL

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**Introduction/objectives:** Femoral stem anteversion during hip arthroplasty is generally estimated by eye intraoperatively and proven to be inaccurate. This study aimed to determine the accuracy of a novel technique of using a digital protractor and a spirit level for improving surgeons' estimation of stem anteversion.

**Methods:** A prospective non-randomized study was conducted among 93 patients with femoral neck fracture who underwent cemented hemi-arthroplasty via posterolateral approach. In the control group (n=62), 5 experienced surgeons assessed stem anteversion related to the femoral condylar plane by their visualization at the target angle of 15°-25°. In the study group (n=31), another 2 surgeons assessed by placing a digital protractor on the femoral broach while the assistant held the leg in the truly vertical position, verified it by a spirit level that was attached to the shin with cable ties. Stem anteversion was measured blind postoperatively on 2D-CT and compared to intraoperative results. The data were compared between groups by using the exact probability test and t-test.

**Results:** The mean postoperative anteversion was 22.4° (-4 to 54, SD 11.1) in the control group and 23.0° (16 to 30, SD 3.6) in the study group (p=0.810). The mean difference between the intraoperative assessment and 2D-CT results was -0.5° (-5 to 7, SD 3.0, 95%CI -1 to 1) in the study group. The study group had more stems positioned in 15°-25° anteversion (71.0% vs 32.3%, p=0.001). Underestimation was found to be significantly lower in the study group (0% vs 29%, p<0.001), but not different for overestimation (29% vs 39%, p=0.491).

**Conclusion:** Using a digital protractor and a spirit level was reliable with high accuracy for improving the intraoperative estimation of femoral stem anteversion.

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## P11 Registries and outcome

### P11-335

#### PREOPERATIVE PATIENT REPORTED OUTCOMES MAY PREDICT IN-HOSPITAL OUTCOMES FOLLOWING THA

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**Introduction/objectives:** In this study, we evaluate the application of preoperative PRO scores, such as the Hip dysfunction and Osteoarthritis Outcomes Score (HOOS) and EuroQol-5Dimension (EQ-5D), as potential predictive modelling tools to anticipate adverse in-hospital outcomes.

**Methods:** Patients between the ages of 18 to 95 undergoing a primary THA between January 2015 and January 2017 at this institution were chart reviewed for inclusion in this study. 40% of our patient population completed preoperative PRO scores within 1 year of surgery and were included in this study. Nursing documentation was reviewed for patient demographics and in-hospital course metrics, such as visual analogue scale (VAS) for pain and morphine equivalence usages. EQ-5D was noted to be binomially distributed and subsequently transformed into a categorical variable with patients scoring >50% placed into a "high EQ-5D" group, and those scoring below into a "low EQ-5D" group.

**Results:** In total, 349 patients including 157 males and 192 females were recruited for this study. The average age and body mass index (BMI) was 62.4±11.0 years and 28.6±5.61 kg/m<sup>2</sup>, respectively. The median American Society of Anesthesiology (ASA) Score within our patient cohort was 2. Of the pre-operative scores, age, BMI, EQ-5D, and HOOS section scores were compared with average daily pain, all but age were significantly correlated. However, these values had low r<sup>2</sup> values <0.1, indicating poor predictive strength.

**Conclusion:** Our study demonstrates that baseline PRO scores, such as the HOOS and EQ-5D, contain a small predictive component for in-hospital pain scores and average daily morphine. Furthermore, PRO tools can potentially be used to develop systematic, predictive risk stratification models.

## P11 Registries and outcome

### P11-237

#### INFLUENCE OF SURGICAL TECHNIQUE QUALITY ON MORTALITY, COMPLICATIONS AND FUNCTIONAL RESULT AFTER HIP FRACTURE IN 915 PATIENTS OLDER THAN 65 YEARS: POOR REDUCTION AS A RISK FACTOR FOR MORTALITY

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**Introduction/objectives:** Influence of surgical quality (as evaluated in the post-surgical radiographic control) on mortality, complications and functional result in patients older than 65 years with a hip fracture.

**Methods:** Observational study of a single-center prospective consecutive cohort: 915 patients of 86±7.2 (65-104) years, 706 (77.1%) female, from 2013 to 2015. 525 extracapsular (57.3%) were fixed with 510 trochanteric nails (Affixus-DePuy) and 15 sliding-hip-screw-plate (Biomet). Intracapsular fractures (390, 42.6%) were treated with cannulated screws (Smith-Nephew) (77) or arthroplasty (310 bipolar, 3 total, Furlong-JRI). Surgical quality was analyzed on postop radiographs. Follow-up: 12 months. Bivariate analysis (Pearson, Fischer, Mann-Whitney, Wilcoxon) was applied to study statistically significant relations, and Relative Risks (RR) were calculated.

**Results:** Along FU 116 patients (12.7%) died: poor reduction was a significant risk factor in cannulated screw group (p=0.0496) (RR 7.56, 1.55-36.78) and trochanteric nail group (p=0.0033) (RR 2.089, 1.28-3.4), a not previously published risk factor. Complications included 22 wound infections (2.7%), 7 non-unions (0.8%), 8 cut-outs (1.6%), 5 broken nails (1.0%), 11 hemiarthroplasty dislocations (3.7%), and 1 ischemic necrosis of femoral head (1.0%); the only significant risk factor was poor reduction for non-union in cannulated screws (p=0.016) (RR 22.67, 2.39-215). Previous walking ability was restored in 309 patients (38.7%) and worsened in 337 (42.2%), but statistical relations were not found, although follow-up data were inadequate in 153 cases (19.2%).

**Conclusion:** Appropriate reduction of hip fractures appears as a significant step to reduce mortality and non-union risk.

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## P11 Registries and outcome

### P11-238

INFLUENCE OF ANEMIA AND BLOOD COAGULATION ON MORTALITY, MEDICAL AND SURGICAL COMPLICATIONS IN 915 PATIENTS OLDER THAN 65 YEARS WITH A HIP FRACTURE.

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**Introduction/objectives:** To analyse the influence of International Normalized Ratio (INR) and haemoglobin (Hb) at admission on mortality and complications in patients older than 64 with a hip fracture.

**Methods:** Observational study of a single-center prospective consecutive cohort: 955 patients of 86±7.2 (65-104) years, 725 (75.9%) female, from 2013 to 2015. Fractures were extracapsular in 538 cases (56.3%) and intracapsular in 417 (43.7%). Patients were controlled clinically and radiographically in out-patient clinic after 1, 3, 6, and 12 months. Statistical analysis: data were collected in a Microsoft Excel spreadsheet for the year following the fracture. Bivariate analysis (Mann-Whitney, Student, Welch) was applied to study statistically significant relations, and Odds Ratio were calculated.

**Results:** On arrival at hospital, mean levels were Hb 12,7±1,7 g/dl and INR 1,26±0,8. A 13.8% of patients died (130) along the first year, 5.3% of them while in-hospital. Most frequent complications were respiratory infection (13.5%), urinary infection (11.4%), congestive heart failure (7.2%), sepsis (4.4%), prosthesis dislocation (3.7%), wound infection (2.7%) and cut-out (1.6%). Higher INR is correlated to greater mortality (p=0,008), but lower Hb not. Lower Hb levels at admission are related to heart failure (p=0,003). Higher INR levels are significantly related to respiratory infection (p=0,04), urinary infection (p=0,038), congestive heart failure (p=0,000) and sepsis (p=0,001).

**Conclusion:** 1. A higher INR at admission is associated with greater mortality, sepsis, respiratory and urinary infections, and congestive heart failure in hip fracture patients.  
2. Lower haemoglobin levels are related to congestive heart failure in these patients.

## P11 Registries and outcome

### P11-578

NO VALUE OF THE ISAR SCORE FOR SELECTING SUITABLE PATIENTS FOR POSTOPERATIVE IC ADMISSION AFTER HIP FRACTURE SURGERY

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**Introduction/objectives:** Patients with hip fractures are often frail elderly. Guidelines suggest close monitoring postoperative to minimise the risk of complications. In our hospital, frail elderly are closely monitored at the Intensive Care Unit (ICU). Since there are no validated tools to identify frail elderly in need of ICU monitoring, we use a modified version of the Identification of Seniors At Risk (ISAR). This study evaluated the use of the modified ISAR score as a predictor of necessary ICU admission in frail elderly after hip fracture surgery.

**Methods:** We retrospectively collected data of all patients of 70 years or older with hip fractures who underwent surgery followed by ICU monitoring in the Westfriesgasthuis hospital in 2015 and 2016. We analysed the ability of the ISAR outcome for each patient to predict a necessary ICU admission. Defined as one or more of the following interventions: administration of vasopressors, >6L oxygen/min, any form of rate control for heart rates < 40 or >150 bpm, more or equal to 4L IV crystalloid infusion within 24h and/or >4 units of blood within 24h.

**Results:** 186 patients were included in this study. Overall, 47.8% of ICU admissions were categorised as necessary. Accuracy of the ISAR score to predict a necessary ICU admission was analyzed using the ROC curve. The AUC (area under the curve) was 0.506 which represents a worthless accuracy.

**Conclusion:** The modified ISAR score is not able to predict necessary IC admissions in elderly patients after hip fracture surgery and is therefore not recommended to use as a preoperative screening tool. Further studies will be conducted for determining screenings tools with superior predictive value.

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## P11 Registries and outcome

### P11-310

EFFECT OF ALCOHOL CONSUMPTION ON PATIENT REPORTED OUTCOMES IN HIP ARTHROSCOPY: A MATCHED-PAIR CONTROLLED STUDY WITH MINIMUM 2-YEAR FOLLOW-UP

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**Introduction/objectives:** The rate of hip arthroscopy has increased; however, there is limited literature examining patient reported outcomes (PRO) in people who consume alcohol.

**Methods:** From February 2008 to July 2015, data were prospectively collected and retrospectively reviewed to identify patients that consume alcohol at the time of primary hip arthroscopy. Patients were matched 1:1 (heavy drinkers : non-drinkers) based on patient age ± 5 years, sex, BMI ± 5 kg/m<sup>2</sup>, acetabular Outerbridge grade (0, 1 vs. 2, 3, 4), and capsular treatment (repair vs. release). All patients were assessed pre- and postoperatively with 4 patient-reported outcome measures: modified Harris Hip Score (mHHS), Non-Arthritic Hip Score (NAHS), Hip Outcome Score-Sport Specific Subscale (HOS-SSS), and International Hip Outcome Tool 12 (iHOT-12). Pain was estimated on the visual analog scale. Satisfaction was measured on a scale from 0-10.

**Results:** 42 patients were included in the heavy drinking group and 42 patients were included in the control group. Both groups demonstrated significant improvement for all PROs collected and for VAS from preoperative baseline. At 2-year follow-up, the heavy drinking group reported diminished improvement in HOS-SSS scores (P = 0.0169) as well as smaller decrease in pain after surgery (P = 0.0157) compared to control. The heavy drinking group averaged lower post-operative scores on the iHOT-12 (P = 0.0302) and on mental components of the SF-12 (P = 0.0086) and VR-12 (P = 0.0151) questionnaires. Significantly fewer patients in the heavy drinking group reached PASS for this the mHHS measure (P = 0.0329).

**Conclusion:** While hip arthroscopy may still yield clinical benefit in drinkers, patients who consume heavy amounts of alcohol may achieve an inferior functional status.

## P11 Registries and outcome

### P11-425

RELATIONSHIP BETWEEN FORGOTTEN JOINT SCORE-12 AND PATIENTS' OUTCOMES AFTER REVISION TOTAL JOINT ARTHROPLASTY

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**Introduction/objectives:** Patients evaluating tools assessing the outcome after revision total knee arthroplasty (rTKA) and revision total hip arthroplasty (rTHA) frequently focus on objective ratings and often neglect patients' needs and views. However, patients' concerns after arthroplasty may differ significantly from the results of objective ratings. The aim of this study was to investigate the relations between Forgotten Joint Score-12 (FJS-12) and the other measurement parameters in patient with revision joint arthroplasty.

**Methods:** A total of 40 patients (rTKA; 27, rTHA; 13) were included in the study with mean age 67.1±10.7 years. Patients performed patient-reported tests (FJS-12, Hospital for Special Surgery (HSS), Harris Hip Score (HHS)), 3 performance tests (50-Step Walking Test, 10 Meter Walk Test, 30-Second Chair-Stand Test), and pain level evaluation (Numeric Pain Rating Scale (NPRS)) were preferred to assess patients.

**Results:** There were moderate significant correlation between FJS-12 and pain level (r=-0.397, p=0.01) in all patients. While, strong significant correlation was found between FSJ-12 and HHS (r=0.815, p=0.001) in rTHA patients, there were low, but not significant correlation between FSJ-12 and HSS knee score (r=0.236, p>0.05) in rTKA patients. Also there were not significant correlation FSJ-12 and all other performance tests (p>0.05) in all patients.

**Conclusion:** According to study results, with improvement in pain the patient can "forget his joint" by higher scores and this way patient may obtain good functional outcomes in daily life. Also the relation of FJS-12 to HHS suggests that FJS-12 as an instrument to evaluate outcome is proposed for rTHA patients.

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## P11 Registries and outcome

### P11-509

#### AN ARTHROPLASTY CHECKLIST

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**Introduction/objectives:** The WHO surgical safety checklist was introduced in 2008 to decrease morbidity and mortality. However, the National Patient Safety Agency reported 36 orthopaedic related 'never' events between April and September 2017. Of these, 18 were incorrect hip or knee implants - details which are not included in the checklist currently. A cataract specific checklist was introduced in 2015 to reduce the number of never events in cataract surgery, modifying the WHO checklist with 4 extra questions.

We surmised that a small number of additional questions would improve safety in hip arthroplasty.

**Methods:** A Delphi study of 14 high volume hip arthroplasty surgeons was undertaken asking them to rank the most important radiographic metrics on postoperative pelvic radiograph, which correlated with quality.

**Results:** The Delphi threw up a number of elements that all agreed were key to a successful outcome. Leg length, combined offset, femoral component size, and acetabular inclination and anteversion and acetabular component size were deemed most important by all 14 surgeons, although the order varied. From these results, three topics were derived for the checklist:

- 1) Are there any diagnostic bone health or spinal issues to be considered?
- 2) Are there any issues regarding planned restoration of leg length and offset?
- 3) Has the size and make of the devices been selected, and the presence of alternatives confirmed should they be needed?

**Conclusion:** We think these questions should be added to make a hip arthroplasty checklist. We plan to trial it in our hospital, and carry out a prospective observational study, to see if more detailed planning translates to better results in patients. This checklist will be of particular importance to trainees to improve surgical outcome.

## P11 Registries and outcome

### P11-82

#### PATIENT REPORTED OUTCOME AFTER HIP DISLOCATION IN PRIMARY TOTAL HIP ARTHROPLASTY; A SYSTEMATIC LITERATURE REVIEW

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**Introduction/objectives:** Total hip arthroplasty (THA) is a successful operation for patients suffering from debilitating end-stage hip osteoarthritis. However, severe complications do still occur, and hip dislocation remains one of the most common reasons for revision surgery. The decision whether to continue with a non-operative regime or to perform salvage surgery depends on several factors which may cause the dislocations but also the patient's perspective. Since quality of life and subjective hip function is of major importance for the patient we performed a systematic review on Patient Reported Outcome (PRO) after dislocation of primary THA compared to patients without dislocation with a primary diagnosis of osteoarthritis (OA).

**Methods:** We searched Pubmed, Embase, SveMed and Cochrane databases in September 2017 and identified 3460 unique studies. The review was registered in PROSPERO and conducted independently by 2 researchers and reported following PRISMA statement.

**Results:** 2 studies met the a priori inclusion criteria's and they presented divergent results between patients with/without dislocation using a variety of well-known PRO measures (PROM). Extending the scope of the present review, we found no additional studies presenting PRO after a dislocation without comparisons to non-dislocators exclusively in THA patients with OA.

**Conclusion:** This review has revealed that knowledge of patient reported quality of life and subjective hip function post-dislocation is merely non-existing. Although arthroplasty surgeons may possess empirical assumptions on the matter, there is a need for additional and larger scale studies to examine the subject in order to properly inform THA patients with dislocation regarding what they can expect afterwards and when to recommend reoperation.



## P11 Registries and outcome

### P11-344

#### WHICH OF THE PATIENT-REPORTED OUTCOME MEASURES IN TOTAL HIP ARTHROPLASTY REHABILITATION SHOULD BE USED?

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**Introduction/objectives:** The aim of this study was to compare patient-reported outcome measures and measurement characteristics used in total hip arthroplasty rehabilitation.

**Methods:** A search of PubMed, and PEDro databases up to December 2017 were researched and published randomized controlled trials were reviewed. The outcome measure used in each study was determined. The quality of the measurement properties were assessed based on the Terwee and Bot criteria, and Scientific Advisory Committee of the Medical Outcomes Trust guidelines.

**Results:** 34 outcome measures were determined that were used in 60 randomized controlled trials. Of the outcome measures, 5 are general/benefit criteria and the rest are special measures. The Western Ontario McMaster University Osteoarthritis Index (WOMAC), Short Form 36 (SF-36) and HHS (Harris Hip Score) were the most thoroughly examined instruments in these populations.

**Conclusion:** A wide variety of patient-reported instruments have been used to evaluate rehabilitation outcomes after total hip arthroplasty, but information about the measurement features in these populations is insufficient. There is a need for researchers and clinicians to determine the optimal outcome measures to be used for clinical practice or a study.

## P11 Registries and outcome

### P11-447

#### EFFECTS OF HIP ARTHROPLASTY ON SLEEP QUALITY

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**Introduction/objectives:** Total hip arthroplasty (THA) is known as the surgery of the 20th century. Although there are several studies regarding THA, the effects of this study on patients' quality of life and life style is not clearly understood. The aim of current study was to investigate the effects of THA on sleep quality one year postoperatively.

**Methods:** There were 101 consecutive patients candidate for unilateral THA. Before and one year after the operation, Pittsburgh Sleep Quality Index (PSQI) was completed. Finally, the pre- and post-operative findings were compared. Furthermore, the presence of correlation between time of anesthesia and operation with PSQI was investigated.

**Results:** PSQI averaged 7.2±3.6 preoperatively and decreased significantly to 2.7±2.6 at the end of 1st postoperative year (p=0.001). The time of operation and anesthesia were positively correlated with medication component of PSQI (rho=0.238; p=0.017 for operational time and rho=0.236; p=0.018 for time of anesthesia).

**Conclusion:** The quality of sleep improved significantly one year after THA compared to before the operation. In addition, the patients who experienced longer time of anesthesia and operation required more usage of medication.



## P11 Registries and outcome

### P11-89

#### DEVELOPMENT AND VALIDATION OF THE BRABANT HIP FRACTURE SCORE FOR 30-DAY AND 1-YEAR MORTALITY

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**Introduction/objectives:** Hip fractures in the elderly are associated with advanced comorbidities and high mortality rates. Mortality prediction models can support clinicians in tailoring treatment for medical decision making in frail elderly patients. The objective of this study was to develop and internally validate the Brabant Hip Fracture Score, for 30-day (BHFS-30) and 1-year mortality (BHFS-365) after hip fracture.

**Methods:** A cohort study was conducted in two hospitals in operatively treated patients of 65 years and older with a hip fracture. Manual backward multivariable logistic regression was used to select independent predictors of 30-day and 1-year mortality. Internal validation was performed using bootstrapping techniques. Model performance was assessed with: (i) discrimination via the area under the receiver operating characteristic curve (AUC); (ii) explained variance via Nagelkerke's R<sup>2</sup>; (iii) calibration via Hosmer-Lemeshow test and calibration plots.

**Results:** Independent predictors of 30-day mortality were: age, gender, living in an institution, Hb, respiratory disease, diabetes and malignancy. In addition, cognitive frailty and renal insufficiency, were selected in the BHFS-365. Both models showed acceptable discrimination after internal validation (AUC=0.71 & 0.75). The Hosmer-Lemeshow test indicated no lack of fit (p>0.05).

**Conclusion:** We demonstrated that the internally validated and easy to use BHFS in surgically treated elderly patients after a hip fracture showed acceptable discrimination and adequate calibration. In clinical practice a cut-off of BHFS-30 >24 could identify frail elderly patients at high risk for early mortality and could support clinicians, patients and families in tailoring treatment for medical decision making.

## P12 Revision THA

### P12-507

#### NONMODULAR STEMS ARE A VIABLE ALTERNATIVE TO MODULAR STEMS IN REVISION TOTAL HIP ARTHROPLASTY

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**Introduction/objectives:** Nonmodular and modular femoral stems have been associated with complications following revision total hip arthroplasty (rTHA). This study aims to report outcomes of modular and nonmodular femoral components in rTHA.

**Methods:** From January 1st, 2013 to September 30th, 2017, all rTHAs using modular or nonmodular femoral stems were identified. Demographic data including age, gender, American Anesthesiology Society (ASA) score, Surgical details including operative time, length of implant, and implant cost were collected. Clinical outcomes including length of stay (LOS), dislocation, infection, fracture, femoral implant re-revision, reoperation, and mortality were also collected. Simple linear regression analysis and sub-analysis using multivariable logistic regression were performed.

**Results:** Of 247 rTHA cases identified, 136 (55.1%) cases utilized modular stems while 111 (44.9%) cases utilized nonmodular components. The average follow-up was 15.5 months (range 0.5-59 months). Nonmodular stems had a significantly lower cost when compared to modular implants (54.3% of modular cost; p<0.001). There were no differences appreciated in cohort demographics including age (p=0.831), gender (p=0.459), and ASA (p=0.053). In addition, there were no differences observed in the surgical details or clinical outcomes assessed, including operative time (p=0.386), LOS (p=0.638), and rates of re-revision of the femoral implant (p=0.327), re-operation (p=0.410), and post-op complications including, infection (p=0.322), dislocation (p=0.687), fracture (p=0.528), and mortality (p=0.446).

**Conclusion:** The use of distal fixation, tapered-fluted, titanium nonmodular components may offer a more cost-effective approach to rTHA compared to their modular counterparts.

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## P12 Revision THA

### P12-96

#### STRUT ONLY ALLOGRAFT IN REVISION ARTHROPLASTY - OSSEOUS UNION AND CLINICAL OUTCOME

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**Introduction/objectives:** To investigate the outcome of the surgical technique 'Strut Only Allograft (SOA)' during revision hip arthroplasty. We assumed 1) high union rates between SOA and host bone, 2) little or no loss of correction / alignment and 3) good clinical outcome as determined by patient reported outcome measurements.

**Methods:** Patients who previously underwent revision hip arthroplasty at our department with concomitant SOA implantation were considered. 'Osseous union' between the strut allograft and the host bone was verified by radiography in two planes according to the classification system of Emerson et al. The patient reported clinical outcome was assessed with the 'Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)'. Besides the limb-specific outcome the ambulatory status was assessed with the Parker-Mobility-Score (0=Worst, 9=Best). Medians and Interquartile-Ranges were calculated as descriptive statistics.

**Results:** In our records, 43 patients were identified. Of those, 13 were deceased, 7 could not be contacted, 6 refused to participate. Consequently, 17 cases were available data collection (age 66, BMI 23.2). Regarding Osseous Union we found complete bridging of the SOA to the recipient bone in 76.5% of the cases. In 17.6% the SOA showed partial bridging to the recipient bone. Only one case showed loss of correction / alignment. The WOMAC total was 22±21. The Parker Mobility Score was found 8±4.

**Conclusion:** On the basis of our findings it is concluded that the use of strut only bone allografts in advanced hip revision arthroplasty is a promising technique. The majority of SOAs is integrated into the recipient bone stock (bone augmentation) and provides additional mechanical stability.

## P12 Revision THA

### P12-419

#### CLINICAL AND RADIOLOGICAL FOLLOW UP OF POROUS METAL ACETABULAR CUP IN REVISION TOTAL HIP ARTHROPLASTY

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**Introduction/objectives:** In hip revision surgery the main goals are, to attain a good primary stability of the implant and to restore the centre of rotation (COR) of the joint. The osteolysis that accompanies aseptic loosening undermines the stable fixation and correct position of the acetabular cup. Objectives: Measure the functional outcome and acetabular loosening rates of patients who underwent acetabular revision surgery using porous metal components.

**Methods:** Case series study including all the patients operated by the senior author for acetabular revision surgery between November 2005 and July 2012. They were assessed using the Harris Hip Score (HHS), the Paprosky acetabular classification and the post-op position of the implants. We used digital x-rays and imaging software to calculate the final COR of the hip and the difference to the opposite side.

**Results:** We identified 40 patients, from those 35 were available to clinical evaluation and 37 to radiographical evaluation. The mean follow-up was 4.8 years. Age at the time of procedure was 69 ± 11 years. Seven cases were Paprosky 3A and two cases 3B. The mean HHS improved from a pre-op value of 28.02 ± 18.5 to 78.2 ± 13.9 in the post-op. The mean post-op acetabular cup angle was 46° ± 5.6°. The mean difference between the height of the COR in the operated and opposite side was 6.65 ± 11 mm in the post-op. During follow-up we observed migration of the COR greater than 4 mm in 3 hips.

**Conclusion:** In this series it was possible to accomplish a stable fixation of the cup, as shown by the minimal migration of the cups during the follow up, and the restoration of the COR to a more distal position in all of the hips. The good radiographic results are accompanied by an increase in the post-op HHS.

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## P12 Revision THA

P12-467

STEPWISE EVALUATION AND SURGICAL CORRECTION OF INSTABILITY IN TOTAL HIP ARTHROPLASTY  
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**Introduction/objectives:** Surgical correction of instability after total hip arthroplasty (THA) remains a complex challenge to the hip arthroplasty surgeon. At our institution, we have developed a stepwise evaluation and surgical correction strategy for patients presenting with THA instability.

**Methods:** 37 patients presenting to a single surgeon for evaluation of THA instability underwent a standardized pre-operative protocol to determine causative factors leading to instability. Radiographic images were reviewed for leg length, offset, cup inclination and anteversion, and dynamic changes in pelvic tilt from supine to standing, and standing to sitting. Findings were confirmed intraoperatively, and instability was addressed surgically through the stepwise algorithm.

**Results:** 37 consecutive patients have been prospectively revised for THA instability. Average pre-operative acetabular abduction was 47.8 degrees and anteversion was 13.4 degrees. Average pelvic incidence was 38 degrees.

The acetabular component alone was revised in 22 patients, and the stem alone in 2 patients. Both acetabular and femoral components were revised in 4 patients. There were 9 cases where the head and liner were exchanged to a larger size. No isolated head or isolated liner exchanges were performed. Dual mobility heads were used in 20 patients (54%), with 40mm heads used in 11 patients and 36mm heads used in 6 patients. Post-operative acetabular abduction was 39.2 degrees (range 37-43) and post-operative anteversion was 27.3 degrees (range 22-34),  $p < 0.003$  for both.

**Conclusion:** Using this stepwise evaluation as a tool to guide surgical correction of instability, our study demonstrates a significant and promising decrease in the risk of recurrent instability in this high-risk population.

## P12 Revision THA

P12-430

RELATIONSHIP BETWEEN MUSCLE STRENGTH AND FUNCTIONAL LEVEL IN PATIENTS WITH REVISION TOTAL HIP ARTHROPLASTY  
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**Introduction/objectives:** Revision total hip arthroplasties (rTHA) are performed with increasing frequency due to the increasing numbers of primary arthroplasties, but very little is known regarding the influence of muscle strength impairments on functional limitations in this population. The aim of this study was to assess relationship between muscle strength and functional level in patient with rTHA at late stage.

**Methods:** Thirteen patients who had undergone rTHA mean  $6.66 \pm 4.81$  years ago were included in the study with mean age  $63.61 \pm 12.17$  years. Patients performed 4 performance tests (50-Step Walking Test, 10 Meter Walk Test, Iowa Level of Assistance Scale (ILAS), Iowa Ambulation Velocity Scale (IAVS)), and one self-report test (Harris Hip Score (HHS)) were preferred to assess patients. The maximum isometric strength of surgical limb hip flexor, extensor, and abductor muscle of all the patients was measured using Hand-Held Dynamometer (HHD).

**Results:** The high significant correlations were found between hip flexor, extensor muscle strength and ILAS ( $r=0.702$ ,  $p=0.011$ ; ( $r=0.744$ ,  $p=0.022$ , respectively), and there were the high significant correlation between hip extensor muscle strength and IAVS ( $r=-0.862$ ,  $p=0.006$ ). Also there were the high significant correlation between hip extensor muscle strength and the 10-meter walking time ( $r=-0.735$ ,  $p=0.038$ ). There were not significant correlation between all other evaluating parameters ( $p > 0.05$ ).

**Conclusion:** The strong statistical significant correlation between hip extensor, flexor muscle strength and functional performance tests suggests that improved postoperative muscle strengthening could be important to enhance the potential benefits of rTHA.

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## P12 Revision THA

P12-336

SHORT-TERM OUTCOMES WITH A MONOLITHIC, TAPERED, FLUTED, GRIT-BLASTED, FORGED TITANIUM REVISION FEMORAL STEM  
Feng, J.\*<sup>(1)</sup>; Anoushiravani, A.<sup>(1)</sup>; Dogra, T.<sup>(1)</sup>; Schnaser, E.<sup>(2)</sup>; Lutes, W.<sup>(2)</sup>; Vigdorichik, J.<sup>(1)</sup>; Schwarzkopf, R.<sup>(1)</sup>  
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**Introduction/objectives:** Here we report on the short-term outcomes of a novel monolithic, tapered, fluted, grit-blasted, forged titanium stem.

**Methods:** A multicenter, retrospective study was conducted using institutional databases. Patients were included for this study if they underwent primary or revision THA surgery using this particular monolithic, tapered, fluted, grit-blasted, forged titanium stem. Demographic data was collected including gender, age, race, body mass index (BMI), number of prior hip surgeries, and Charlson Comorbidity Index. Surgical data included reason for revision, femoral bone stock as determined by the Paprosky classification, use of trochanteric osteotomies, and length of stay (LOS). Outcomes data included 30- and 90- day complications and readmissions, revision for any reason, femoral revision free interval, and post-operative implant subsidence assessed on serial radiographs.

**Results:** Sixty-three THAs in 62 patients were included in this study. Mean total subsidence from baseline was 1.615 mm at 2 weeks postoperatively (20/62 hips), 1.595 mm at 6 weeks (21/62 hips), 1.267 mm at 3 months (18 hips), 1.430 mm at 6 months (10/62 hips), and 2.167 mm at 9 months (3/62 hips). Three patients underwent subsequent femoral head and liner exchange within 1 year of surgery: 1 for recurrent dislocation, 2 for early periprosthetic joint infection.

**Conclusion:** In total, only 4 patients in our multicenter case series had progressive subsidence within the first three months postoperatively, while the remaining 34 hips with radiographic data had either no subsidence or clinically insignificant subsidence ( $< 5$ mm). However, the available data suggests that this monolithic, tapered, fluted, grit-blasted, forged-titanium stem achieves early stable femoral fixation.

## P12 Revision THA

P12-244

CUP MIGRATION AFTER ACETABULAR REVISION SURGERY WITH IMPACTION BONE GRAFTING AND A CEMENTED CUP IN LARGE BONE DEFECTS  
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**Introduction/objectives:** Impaction bone grafting (IBG) is a reliable technique for acetabular revision surgery with large segmental defects. However, bone graft resorption and cup migration are some of the limitations of this technique. We assess frequency and outcome of these complications in a large acetabular IBG series.

**Methods:** We analysed 330 consecutive hips that received acetabular IBG and a cemented cup in revision surgery with large bone defects (Paprosky types 3A and 3B). Fresh-frozen femoral head allograft was morselized manually. The mean follow-up after re-revision was 17 years (3-26). All data were prospectively collected. Kaplan-Meier survivorship analysis was performed. Changes in different parameters regarding cup position were assessed pre- and postoperatively and at the follow-up controls. Only variations greater than  $5^\circ$  and 3 mm were considered.

**Results:** The mean Harris Hip Score improved from  $48.3 \pm 8.5$  to  $84.6 \pm 12.8$  at final follow-up. The radiological analysis showed cup migration in 40 hips. The mean appearance time was 4.3 years (range, 1-25). Migration was progressive and painful in 27 hips (67.5%) requiring cup revision. Lateral mesh was more frequently associated with migrated cups. Cup tilt was found in all migrated cups. Survival with further cup revision for aseptic loosening was 78.3% (95% confidence interval: 68.7-87.9) at 17 years. In all surviving re-revisions trabecular incorporation was observed without radiolucent lines.

**Conclusion:** IBG continues to be a reliable technique for large defects in acetabular revision surgery. Bone graft resorption and cup migration was not frequent in this large series and one-third of cases were not progressive. Cup migration was more frequent in cases with a segmental roof defect with a lateral mesh.

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## P12 Revision THA

### P12-292

MANAGEMENT OF TOTAL HIP ARTHROPLASTY DISLOCATION: A RETROSPECTIVE COHORT STUDY IN A TERTIARY REFERRAL CENTRE.

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**Introduction/objectives:** Dislocation is a challenging complication after primary and revision of total hip arthroplasty (THA). We assessed the recurrence of dislocation after revision surgery in patients affected by THA dislocation, taking into account the number of previous surgeries and surgical revision procedure.

**Methods:** We included patients undergoing surgery for dislocation after primary or revision THA between 2008 and 2017. Collected data included demographics, previous surgeries, time from primary or revision THA and dislocation, mechanism of dislocation, abductor deficiency, orientation of cup and stem. Recurrence of dislocation after revision surgery was recorded.

**Results:** Ninety-four patients were included: 45 had dislocation after primary THA (G1) and 49 after revision surgery (G2). The most common cause of dislocation was inadequate placement of cup and/or stem (G1: 74.3%, G2: 66.7%). Recurrence rate of dislocation was significantly higher in the G2 (20.5% versus 5.7%; OR 3.6, 95%CI 2.8-4). Surgical strategies, isolated or combined, with respective efficacy for the prevention of dislocation recurrence were: modular head (G1: 51.4%/88.9%, G2: 64.1%/76%), cup revision (G1: 68.6%/95.8%, G2: 38.5%/80%), liner exchange (G1: 22.9%/87.5%, G2: 43.6%/88.2%), bone resection (G1: 11.4%/100%, G2: 10.3%/100%), stem revision (G1: 5.7%/100%, G2: 5.1%/100%). The acetabular constructs with lower recurrence of dislocation were constrained liner and dual mobility cup in the G1 (0%) and constrained liner and elevated rim liner in the G2 (13.3% and 18.7%).

**Conclusion:** Modular heads and cup revision were effective to reduce the risk of dislocation recurrence. Constrained liner and dual mobility cup prevented recurrence of dislocation in patients with instability after primary THA.

## P12 Revision THA

### P12-490

REVISION HIP ARTHROPLASTY IN PAPROSKY TYPE III ACETABULAR DEFECTS

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**Introduction/objectives:** The acetabular defects Paprosky type III and particularly where the penetration intrapelvic occurs substantially alter the anatomy of the hip. In many of these cases there is a medialization implants associated with its loosening it difficult to know the relationship with vascular structures and the risk of injury to the time of revision surgery. Performing a selective arteriography allows us to assess the relationship of the implants to the iliac artery. We present our experience in eight cases of patients operated by total hip prosthesis with Paprosky type III defect and who underwent preoperative selective arteriography.

**Methods:** We present 7 patients, 5 women and 3 men with a mean age of 76 years who had a prosthetic loosening Paprosky type III and those who underwent preoperative selective arteriography. All patients were operated by sticking crushed cancellous allograft contribution (Stoiff technique) along a Burch-Schneider ring and cemented cup.

**Results:** Preoperative arteriography showed an intimate contact between the acetabular component and artery iliac in 3 cases. In these cases, revision surgery was performed by the vascular surgeon. All cases had no intraoperative or postoperative complications or. The average follow-up clinical evaluation was 15 points (Merle D'Aubigné). Clinical evaluation teaches us a good graft incorporation without component loosening.

**Conclusion:** The use of arteriography in planning hip revision surgery in III acetabular defects is essential to prevent vascular lesions.

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## P12 Revision THA

### P12-473

FACTORS AFFECTING SUBSIDIENCE IN A MODULAR TAPERED STEM FOR REVISION TOTAL HIP ARTHROPLASTY

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**Introduction/objectives:** To report on subsidence rates using a single modular tapered femoral revision implant and determine radiographic risk factors for subsidence

**Methods:** We reviewed radiographs from 41 hips who underwent revision total hip arthroplasty using the modular Stryker Restoration hip system with a tapered stem. Patient data was obtained from theatre registers and a local database. A radiological review was carried out using the PACs and NIMS imaging databases. Preoperative radiographs were scored according to the Paproski system

**Results:** 41 revision arthroplasties carried out in the elective setting from 2009- 2016 were included 21 male & 19 female (41 hips). Full data was available for 38. The mean age was 68(48-87). The Median follow up was 4(1-8) years. The mean subsidence was 3.43 mm (0.3 - 11.1 mm). In our Cohort 3 were revised due to infection, 2 were revised due to femoral osteolysis and 1 was revised due to acetabular osteolysis. Two revisions were carried out within 1 year and were excluded. Post-operative bi-cortical contact of the proximal stem < 20mm was associated with higher subsidence rates (P = 0.047). Total implant osseous integration rates < 60% were associated with higher subsidence (p= 0.0076). Subsidence was significantly associated with a stem length >=195mm (P=0.03) and use of Extended Trochanteric osteotomy (P=0.016)

**Conclusion:** The use of a modular tapered stem for revision femoral arthroplasty demonstrated 14% revision rates which is in keeping with previous literature. Our cohort demonstrated a positive and statistically significant association between immediate postoperative proximal stem bi-cortical contact and long term subsidence rates

## P12 Revision THA

### P12-478

A LARGE PROPORTION OF REVISION TOTAL HIP ARTHROPLASTY IS POTENTIALLY PREVENTABLE

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**Introduction/objectives:** As surgeons, we have a moral obligation to address potentially preventable complications in an effort to improve total hip arthroplasty (THA) outcomes. The goal of this study is to identify and report potentially preventable causes for revision THA (rTHA).

**Methods:** A retrospective review of 352 consecutive patients that underwent rTHA or re-revision THA from August 2015 to August 2017 was conducted. 138 of these were identified as primary to rTHA within a 5 year interval. Two adult reconstruction fellowship trained surgeons reviewed perioperative parameters and classified rTHA recipients into two categories: preventable rTHA and non-preventable rTHA. Basic demographics, surgical characteristics for the primary THA (pTHA), and pre- and post-rTHA variables were analyzed.

**Results:** Sixty (43.5%) rTHAs were deemed preventable. Of these rTHA recipients, 20 were male and 40 were female. Mean age at time of rTHA was 61.5 years and mean body mass index was 27.8 kg/m<sup>2</sup>. The following were identified as preventable reasons for rTHA: cup malpositioning (70%), instability (53%), intra-operative fracture (40%), history of spinal surgery/deformity (22%), aseptic loosening (20%), femoral component subsidence (15%), and other (18%). The most common bearing surface during pTHA was cobalt chrome on highly cross-linked polyethylene (40%). The most common femoral head size was 36mm (38%). Technology was used for assistance in 8.3% of pTHAs. Four patients (6.7%) underwent re-revision THA, three for instability and one for aseptic loosening.

**Conclusion:** A high proportion (43.4%) of rTHA is potentially preventable. Furthermore, surgeons are responsible for carefully evaluating causes for rTHA and identifying new methods to address these issues.

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## P12 Revision THA

### P12-437

#### CEMENTLESS ACETABULAR RECONSTRUCTION WITH POROUS MATERIAL: 8 YEARS EXPERIENCE WITH TRABECULAR TITANIUM IN REVISION SURGERIES

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**Case Study:** Objectives: The aim of this prospective study is to evaluate the short to medium-term clinical and radiographic outcomes of acetabular revision cups in Trabecular Titanium (Delta One TT, Delta Revision TT).

**Methods:** Between December 2008 and August 2015 we performed 96 cup revisions, 46 with the Revision cup and 50 with the One cup. The bone defect was classified according to Paprosky classification: type IIB and IIC were treated by Delta One TT; type IIIA and IIIB were treated with Delta TT Revision. According to Delta One series, the causes of revision were: aseptic loosening in 48 cases, periprosthetic acetabular fractures in 5 cases, recurrent dislocation in 5 cases, infection in 2 cases. In 52 cases bone grafts were used to fill the cavity defects. Hemispheric TT augments were used in 13 cases with the same aim. Internal modules were used in 39 cases to restore correct offset. The mean age of patients was 69.6 years (range 29-90). The average follow-up was 39 months (range 19-70).

**Results:** Mean Harris Hip Score was 39.9 preoperatively and 82.7 at last follow-up. We had no intraoperative complications. 4 patients suffered dislocation episodes (1 recurrent); none of them required revision. We had 1 case of asymptomatic aseptic loosening, which did not require intervention. In the remaining cases no radiographic evidence of radiolucent lines was noticed at follow up, neither any evidence of aseptic loosening. The graft was considered to be integrated in all cases.

**Conclusions:** Trabecular Titanium Revision Cups showed high capacity of osseointegration, providing good results in medium-term follow-up in cases of acetabular bone defects Paprosky IIB, IIC, 3A, 3B. Further studies are necessary to assess long-term survivorship.

## P12 Revision THA

### P12-575

#### SHOULD RECONSTRUCTION OF ACETABULAR DEFECTS BE SUPPORTED BY CAGES?

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**Introduction/objectives:** Aim of this study is to evaluate clinical and radiological outcomes of cemented acetabular reconstruction in massive bone defects or pelvic discontinuity.

**Methods:** Between September 2010 and March 2017, 38 cemented acetabular reconstructions were performed: twenty-four cases of aseptic cup loosening (Paprosky type IIC or III), four periprosthetic acetabular fractures with cup mobilization, five recurrent dislocations, three prior infections, one case of metallosis and one case of previous implant remove with severe bone loss. Mean age was 73 years (range 24-92). Pelvic discontinuity or Paprosky III were treated with cages (30 cases). Metal meshes were used in 12 cases (11 of them in association with cages). Bony defects were managed with TM augments (3 cases) or bone impaction grafting technique (25 cases). Stem revision was performed in 12 cases. Fractures were fixed with plate and screws in 2 cases. One liner was cemented into the pre-existing cup due to integration.

**Results:** The average follow-up was 42 months (range 12-89). 11 patients were lost at last follow-up. 3 patients died. Preoperative WOMAC total score in aseptic loosening group was 70.47 (range 70 - 76). At last follow up WOMAC total score in all evaluable patient score was 17.84 (range 0-61). Five patients underwent a revision surgery: 3 cases for cup loosening (one required a custom-made implant), one recurrent dislocation and one deep infection. All the other cups were radiographically stable at last follow-up. We had 7 dislocations. 3 of them required surgery.

**Conclusion:** Cemented acetabular cups supported by cages are an effective treatment for acetabular reconstruction, providing a good quality of life.

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## P12 Revision THA

### P12-296

#### FEMORAL RECONSTRUCTION WITH THIRD GENERATION MEGAPROTHESIS IN NON-TUMORAL PATHOLOGY: A COMPLICATION-RATE ANALYSIS

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**Introduction/objectives:** Following failed revision total hip arthroplasty (THA), massive femoral bone defects can be treated with unconventional megaprosthesis. Since the survival rate of such prosthesis is reported to be noticeably low at short- to med-term follow-up, we aimed to determine the short-term complication rate of proximal femoral reconstruction with the use of modular megaprosthesis (GMRS) (Stryker Corporations, Mahwah, New Jersey, USA) in patients with severe bone-deficient, non-neoplastic conditions.

**Methods:** We analysed a consecutive series of 22 patients (20 women), with a mean age of 72 years (range, 64-93), operated between 2007-2012 at a single institution. Initial diagnosis consisted of 14 septic loosening and 8 aseptic loosening of the femoral component. All cases displayed a type 5 Endo-Klinik femoral bone loss with less than 7 centimetres of distal fixation and had at least 2 prior failed revision THA. Average follow-up was 37 months (range, 12-50). Infection and instability were the main outcomes of the complication-rate analysis.

**Results:** The dislocation rate of the series was 18% (4 cases), treated in all cases with closed reduction. The infection rate was 13% (3 cases), which only one resulted in disarticulation due to uncontrolled sepsis. There were two deaths not related to index surgery. Prosthetic survival, excluding the two patients who died in the immediate postoperative period, was 95%.

**Conclusion:** Due to the high rate of instability and infection in this group of patients, which is in line with the literature, we reserve these implants for low-functional, elderly patients with multiple comorbidities and severe proximal femoral bone loss in which others reconstructive procedures are not feasible.

## P12 Revision THA

### P12-331

#### TRILOGY-CONSTRAINED ACETABULAR COMPONENT FOR RECURRENT DISLOCATION

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**Introduction/objectives:** Dislocation still remains one of the most common complications after primary and especially in revision hip arthroplasty.

**Objective:** To analyze the possibilities of the constrained acetabular device as a solution for recurrent artificial hip dislocation.

**Methods:** We retrospectively reviewed the records of 12 patients at high risk for dislocation who had 12 constrained liners inserted for primary (n = 2) or revision (n = 10) THA between 2013 and 2017. The minimum follow-up was 12 months (mean, 32 months; range, 12-47 months).

**Results:** All 12 patients were seen for the follow-up including radiographs. The constrained acetabular device eliminated or prevented hip instability in all patients. No migration or recurrent dislocation was seen in any patients. One deep infection occurred.

**Conclusion:** A constrained acetabular component provides satisfactory early and mid-term results for the treatment of hip instability in primary and revision replacement in those at high risk of dislocation.

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## P12 Revision THA

### P12-298

#### LONG-TERM RESULTS OF THE BURCH-SCHNEIDER ANTIPROTRUSIO CAGE

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**Introduction/objectives:** The Burch-Schneider anti-protrusion cage (BSAPC) was developed for acetabular revisions with major bone deficiency. Mid- to long-term data for this device are scarce. We therefore investigated long-term survival and radiological results using the BSAPC.

**Methods:** A retrospective analysis of 144 acetabular revisions using a BSAPC in 140 patients (74 female, 66 male, mean age 72 years) was performed. 74 cups were revised due to aseptic loosening, 50 cups due to infection and 19 cups due to other reasons. 55% of the defects were classified as AAOS defect grade III, 39% as grade IV. Survival analysis of the BSAPC was performed with death of the patient as a competing risk. Clinical follow up (HHS, pain) was performed at 1, 2, 5 years and every 5 years thereafter. Radiological assessment was performed before re-revision of the BSAPC or in hips with a minimum follow up of 5-years. It included evaluation of osteolysis, migration and signs loosening.

**Results:** The mean follow-up time was 7.4 (0.5-23.4) years. 65 patients died during the follow-up, (24 of them before the 5-year follow-up). 14 patients were lost to follow-up within the first 5 years. 10 BSAPC were re-revised: 6 for infection, 2 for aseptic loosening and 2 due to mal-positioning of the cup. The cumulative risk for revision (CRR) for the BSAPC was 8.5% at 15 years (95% CI: 4.3-14.6%), while the CRR for death was 65.3% (95% CI: 53.3-74.9%). 96 patients had clinical follow-up data. The mean HHS was 78 (range, 21-96). 88% of the patients had none or mild pain, 12% reported moderate hip pain.

19 of the 82 radiologically examined BSAPC showed signs of migration or loosening, 3 of them were revised.

**Conclusion:** Our data suggests that the long-term survival of the BSAPC in acetabular revision is excellent.

## P12 Revision THA

### P12-74

#### IS CEMENTED REVISION TOTAL HIP ARTHROPLASTY (THA) A REASONABLE TREATMENT OPTION IN A HIGH-AGE POPULATION?

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**Introduction/objectives:** Revision THA in geriatric patients is challenging due to poor bone quality and the need for an immediate full weight-bearing solution. We present our mid-term results using a cemented long version of the Charnley-Kerboull stem.

**Methods:** 38 Centris® (Mathys, Bettlach) stems were implanted 2010-17 and followed prospectively. Surgery occurred via a Hardinge approach in supine position. A 3rd generation cementing technique was used (Palacos R+G Heraeus). 20 stems with a minimum f/u of 2 years were included. Survival was determined for: (i) stem revision for aseptic loosening, (ii) stem and/or cup revision for any reason. Secondary endpoints: subsidence as an early predictor for aseptic loosening (EBRA-FCA), osteolysis, debonding, infection/reinfection.

**Results:** Mean follow-up was 4 ([2-6], SD 1) years and mean age at index surgery 81 ([74-87], SD 3) years. 5 deaths occurred, all unrelated to THA. None lost to f/u. Stem survival was 100%. 4 year survival for any revision was 85% (95% CI 70-100%). 1 cup revision for recurrent dislocations after 4 weeks. 1 early infection after 2 weeks was treated with debridement, head/liner exchange and antibiotics. 2 intraoperative trochanteric fractures were treated with cerclage wires. 2 periprosthetic fractures were treated with osteosynthesis. No subsidence, osteolysis or debonding over the entire f/u. Septic revisions showed no signs of persistent infection at final f/u.

**Conclusion:** The Centris® stem provides a reliable early full-weight bearing solution for revision THA with excellent mid-term survival in a high-aged population. We were not able to detect any subsidence of the stem as an indirect hint for pending aseptic loosening.

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## P12 Revision THA

### P12-23

#### A NOVEL TECHNIQUE FOR REMOVAL OF WELL FIXED THREADED CUP IN REVISION TOTAL HIP ARTHROPLASTY

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#### Case Study: Background:

Removing a well fixed threaded JRI cup in revision hip surgery can be a challenging task with a high incidence of significant bone loss and potential fracture when inappropriate instruments or techniques are utilized. Extractors provided by manufacturers are not easily accessible and may not be readily available and difficult to use.

We propose a standardized and reproducible method using a JRI acetabular shell removal system

**Case Presentation:** After the approach to the hip joint is performed, the hip is dislocated and the acetabulum is exposed. Care should be taken to obtain a 360 degrees visualisation around the acetabular cup. The acetabular rim is identified and cleared of any bony or soft tissue. The slots in the shell's outer surface are identified. The appropriate size blade is fitted onto the acetabular cup removal system (according to the size of the acetabular shell) the cup removal system is placed with the ball in the socket and the blade in one of the slots (one which is easier accessed). Insert the blade in the slot past the first thread and start twisting clockwise while pushing the blade in, against the next thread. The shape of the cup's threads will allow a smooth passage of the blade in a clockwise direction while cutting progressively deeper, thread by thread, until the whole outer surface is cut around the shell and the cup is detached from bone.

**Outcomes:** Using this technique we have successfully removed well-fixed threaded cups in two patients with reduced surgical time and minimal bone loss

**Discussion:** This novel technique is reproducible and should be in the armamentarium of revision hip surgeons when encountering threaded cup in revision hip surgery.

## P12 Revision THA

### P12-84

#### INDICATIONS AND RESULTS JUMBO CUP FOR REVISION TOTAL HIP ARTHROPLASTY

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**Introduction/objectives:** In revision THA or conversion cases, reconstruction of acetabulum may be necessary. One option is using jumbo cup. This study is about indications, complications and short term results of Jumbo cup.

**Methods:** From 2010 to 2017, all revision THA or conversion cases were studied. There were 35 cases which reconstructed with jumbo cup. Demographic characteristics, Harris hip score, infection, dislocation, loosening, LLD and nerve injury were studied. Underlying cause of revision or conversion were considered also.

**Results:** There were 14 males and 21 females with mean age of 59 years (42 -79). They are followed for average 3.5 years (1to 7 years). Cup sizes were between 62 to 74 (average 66). There were Five cases of recurrent dislocation, two cases of second stage of periprosthetic joint infection, four cases of conversion, 4 cases of osteolysis and 3 cases of previous acetabulum fracture fixation and 14 cases of loosening and 3 cases of pelvic discontinuity. Mean Harris hip score rises from 43 to 88. One infection, one dislocation and 29 LLD with mean 1.2 centimeters were seen. One sciatic nerve palsy (proneal branch) and one loosening of cup were seen

**Conclusion:** It is obvious that in short period, jumbo cup has good to excellent results with one dislocation and one infection only. There were 29 cases of LLD because of upward migration of center of rotation of hip joint. In this short period of time, there was no case of loosening, so, it is not relevant to discuss about loosening risk of jumbo cups.

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## P12 Revision THA

### P12-37

UNADDRESSED ARTERIAL INJURIES IN REVISION TOTAL HIP ARTHROPLASTY: MORTALITY OUTCOMES OF A LOW-PREVALENCE COMPLICATION.

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**Introduction/objectives:** Perioperative major arterial haemorrhage after revision total hip arthroplasty (RTHA) is an odd but limb- and life-threatening complication. In this retrospective analysis, we sought to determine the prevalence of such injuries requiring selective catheter embolization or bypass after RTHA and to evaluate treatment's efficacy in terms of mortality.

**Methods:** Between 1995-2016, 2524 RTHAs were performed at a high-volume centre (1031 one-stage revisions, 1370 two-stage revisions and 123 resection arthroplasties). Throughout this period, nine patients presented with signs of persistent bleeding unaddressed during index surgery (9/2524; 0.35%), causing haemodynamic instability. All patients underwent angiographic exploration within the first six postoperative hours. Angiography evidenced 4 cases of bleeding pseudoaneurysms (3 of them related to the common femoral artery and 1 to the medial circumflex femoral artery) and 5 cases of direct lacerations (1 case in the inferior epigastric artery, 1 in the hypogastric artery, 1 in the external iliac artery, 1 in the popliteal artery and another in the superior gluteal artery).

**Results:** Six cases underwent selective percutaneous angiographic embolization with gelatine microspheres, obtaining immediate hemodynamic stabilization; whereas 3 cases required a further bypass surgery with synthetic graft. Of the former group, 4 patients had an uneventful evolution, while 2 died at a mean of 49 days after surgery due to multi-organ failure (MOF). Two cases of the bypass group died because of MOF at a mean of 22 days.

**Conclusion:** The overall risk of arterial injury associated with RTHA was low. However, recognition of such a complication is imperative since it was associated with a high mortality rate.

## P13 Short stems

### P13-379

ASSESSMENT OF IMPLANT FIXATION AND PATIENT-REPORTED OUTCOME OF THE NANOS SHORT HIP STEM - A PROSPECTIVE STUDY

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**Introduction/objectives:** The primary purpose of this study was to evaluate the implant fixation of the NANOS short stem by measuring the migration of the implant and to assess the change in quality of life. The secondary purpose of this study was to evaluate changes in clinical outcome.

**Methods:** 52 patients were included in this prospective study that were treated with the NANOS Neck Preserving Hip Stem (OHST Medizintechnik AG, distributed by Smith & Nephew GmbH, Marl, Germany) between 2011 and 2015 and followed up for 24 months. The study was approved by the ethical committee. Migration was determined by means of model-based radiostereometric analysis (RSA) in 17 patients. Quality of life was assessed by use of the Short-Form 36 Mental Component Score (MCS). Several clinical outcome scores (including the Harris Hip Score and the Hip Disability and Osteoarthritis Outcome Score) were assessed in addition.

**Results:** 48 patients (including 17 by means of RSA) could be followed up for 24 months. The mean total migration was 0.46±0.31mm 2 years after surgery. The largest mean translational values (-0.23±0.36 mm) were observed after three months along the y-axis in distal direction (=subsidence). The migration pattern showed a secondary stabilisation of the stem after 3 months.

The mean MCS improved from 61.3 at baseline to 79.5 points at 24 months. All assessed clinical outcome measures improved significantly from baseline to 2 years (p<0.05).

**Conclusion:** Migration results indicate a good long-term outcome for the NANOS Neck Preserving Hip Stem. The clinical outcome scores showed excellent clinical results.

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## P13 Short stems

### P13-446

GAIT ANALYSIS IN VARUS HIP AFTER TOTAL HIP ARTHROPLASTY: A COMPARISON BETWEEN A SHORT AND CONVENTIONAL HIP STEM

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**Introduction/objectives:** Restoration of native offset seems to be an important predictor of success for the clinical outcome of total hip arthroplasty. The offset has the most influence on the hip abduction moment, if it is decreased more than 5mm this affects the lever of hip abductors. This requires more strength from the abductor muscles, which generally cannot be produced and causes limping during gait (Trendelenburg sign). Offset restoration in varus hips can be difficult when using conventional hip stems, as placement of the stem is limited due to diaphyseal anchorage. In short stems, however, the stem follows the medial side of the calcar, allowing for excellent restoration of a patient's anatomy.

The primary aim of this study is to assess differences in peak hip abduction moment during gait after total hip arthroplasty between patients with the Optimys (short stem) and the CBH (conventional stem) who are preoperatively classified as having varus hips.

**Methods:** This is a case-matched observational pilot study. Gait analysis will be conducted in the innovative Gait Real-Time Analysis Interactive Lab (GRAIL). Twenty patients from the ongoing CBH and Optimys trials (NL47055.048.14 and NL47055.048.13) with varus hips, will be case-matched for age, gender and BMI. All patients are without postoperative complications or other conditions that influences walking pattern and classified as Charnley A (no other lower limb problems or arthroplasty).

**Results:** Patients are now included, we're almost halfway. The data will be analysed between May and June, giving us enough time to draw conclusions.

**Conclusion:** Our hypothesis: short stems are better in restoring offset, therefore showing less limping during gait analysis in patients with varus hips.

## P13 Short stems

### P13-364

SHORT TERM SUCCESS OF PROXIMAL BONE STOCK PRESERVATION IN SHORT HIP STEMS: A SYSTEMATIC REVIEW OF THE LITERATURE

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**Introduction/objectives:** Total hip arthroplasty is performed more frequently in younger patients nowadays, making long-term bone stock preservation an important topic. A mechanism for late implant failure is periprosthetic bone loss, caused by stress shielding around the hip stem due to different load distribution. Short stems are designed to keep the physical loading in the proximal part of the femur to reduce stress shielding. The aim of this review is to give more insight in how short and anatomic stems behave and if they succeed in preservation of proximal bone stock, compared to the recently published review of Knutsen et al on conventional stems.

**Methods:** A systematic literature search was performed to find all published studies on bone mineral density in short and anatomic hip stems. Results on periprosthetic femoral bone mineral density, measured with DEXA, were compiled and analyzed per Gruen zone in percentage change.

**Results:** A total of 26 studies were included. In short stems, Gruen 1 showed bone loss of 6% after 1 year (n=768) and 5% after 2 years (n=179). Gruen 7 showed bone loss of 9% after 1 year and 13% after 2 years. In anatomic stems, Gruen 1 showed bone loss of 8% after 1 year (n=731) and 11% after 2 years (n=227). Gruen 7 showed bone loss of 14% after 1 year and 15% after 2 years.

**Conclusion:** Short stems are capable of preserving proximal bone stock and have less proximal bone loss in the first years, compared to anatomic and uncemented conventional stems.

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## P13 Short stems

### P13-488

SHORT-STEM HIP ARTHROPLASTY: OUTCOMES WITH A MEAN FOLLOW-UP OF 43.5 MONTHS  
Fontalva, M. L.\*<sup>(1)</sup>; Bianco, D.<sup>(1)</sup>; Castellanos, J.<sup>(1)</sup>; Cuñe, J.<sup>(1)</sup>; Tornero, E.<sup>(1)</sup>; Esteve, A.<sup>(1)</sup>  
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**Introduction/objectives:** Short-stem (SS) hip arthroplasty has been gaining popularity over the last few years. Advantages such as bone-preserving procedure, minimally invasive implantation and easier revision surgery have been identified. Review of functional outcomes with this type of implant in our institution was carried out to confirm such advantages.

**Methods:** A retrospective descriptive study that collected data from 39 SS hip arthroplasties (Taperloc Microplasty, Zimmer) between October 2010 and April 2015 with a mean follow-up of 43.5 months. The main indication for surgery was primary osteoarthritis. A posterior approach was used in all cases. Functional outcomes were assessed by preoperative and postoperative Harris Hip score. X-rays were examined to identify signs of lucency or subsidence.

**Results:** Harris Hip score improved in all patients with a mean of 96 points by the last follow-up. X-rays depicted stem subsidence in two cases at the 1-year mark without progression in subsequent follow-ups. Two complications were reported; one intraoperative fracture managed conservatively and a dislocation resolved by closed reduction.

**Conclusion:** Even though classical cementless implants have shown excellent functional outcomes, complications such as stress shielding, thigh pain and lucency lines are still often found. Short-stem implants have tried to overcome such complications by minimising bone resection, preserving the femoral neck and facilitating a more physiological load pattern in the proximal femur. These advantages could reduce the risk of fracture in the long-term and could facilitate surgical revision in the future, especially in the younger population. In our series, SS prostheses had a 100% survival rate with just 5% showing minor complications.

## P13 Short stems

### P13-280

OFFSET RECONSTRUCTION AFTER THA USING A NOVEL SHORT STEM SYSTEM  
Maurer-Ertl, W.\*<sup>(1)</sup>; Friesenbichler, J.<sup>(1)</sup>; Maier, M.<sup>(1)</sup>; Fischerauer, S.<sup>(1)</sup>; Reinbacher, P.<sup>(1)</sup>; Bratschitsch, G.<sup>(1)</sup>; Leithner, A.<sup>(1)</sup>  
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**Introduction/objectives:** The clinical relevance and the number of short stems implanted is increasing. The Ana Nova Proxy short stem was launched in 2015 and has been followed-up clinically and radiologically in a prospective multi-center study. Compared to other short stem systems there is only one stem version available. The aim of the current study was to evaluate the offset reconstruction using different stem systems.

**Methods:** A total of 100 stems were implanted in each device group. In the Corail group six patients were treated bilaterally. Preoperatively and postoperatively the measurement of the acetabular (AO), the femoral (FO) and the total offset (TO) was done using the MedCAD 2D software.

**Results:** In the Ana Nova Proxy group, the mean preoperative FO was 40 mm (SD 6.74 mm) and did not change postoperatively (mean 40 mm, SD 7.75 mm). The average TO was 78 mm preoperatively (SD 8.93 mm) and changed postoperatively to 77 mm (SD 8.19 mm).

For the Optimys short stem, the mean preoperative FO was 39 mm (SD 5.79 mm) and changed postoperatively to 43 mm (SD 7.49 mm). The average TO was 76 mm preoperatively (SD 6.49 mm) and changed postoperatively to 78 mm (SD 8.01 mm).

The mean preoperative FO of the Corail stem was 36 mm (SD 7.63 mm) and changed to an average of 41 mm postoperatively (SD 5.8 mm). The TO was 70 mm preoperatively (SD 8.04 mm) and changed postoperatively to 71 mm (SD 6.29 mm).

**Conclusion:** Clinical and radiological examinations showed an excellent reconstruction of the femoral and the total offset with all stem types, especially with the Ana Nova Proxy System.

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## P13 Short stems

### P13-187

ONE-STAGE BILATERAL TOTAL HIP ARTHROPLASTY: OUTCOME SHORT STEM VS. STRAIGHT STEM  
Friesenbichler, J.\*<sup>(1)</sup>; Maier, M.<sup>(1)</sup>; Reinbacher, P.<sup>(1)</sup>; Leithner, A.<sup>(1)</sup>; Maurer-Ertl, W.<sup>(1)</sup>  
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**Introduction/objectives:** Total hip arthroplasty (THA) is known to be the most successful orthopaedic surgery of the last century. During that time, surgical techniques and implants have improved. The aim of the study was to compare surgical time and outcome, blood loss and hospital stay of patients with simultaneous bilateral THA using a short stem and a straight stem.

**Methods:** Between 2006 and 2018, 45 patients underwent bilateral THA, whereas 23 received a straight stem and 22 a short stem. All surgeries were performed by two experienced senior orthopaedic surgeons. Blood count was checked preoperatively, one and three days postoperatively. All data from operations were collected from the operative reports.

**Results:** Demographic data between the patient groups were similar regarding age, sex distribution and BMI ( $p=0.021$ ,  $0.887$ ,  $0.536$ ). In comparison to straight stem THA, short stem THA showed shorter operation time (mean: 69 vs. 115 min,  $p<0.001$ ), less blood loss (mean Hb postoperatively: 1st day: 10.1 vs. 8.8,  $p=0.009$ ; 3rd day: 9.6 vs. 9.0,  $p=0.068$ ) and shorter length of stay at hospital (mean: 8 vs. 9 days,  $p=0.118$ ). There was one revision for increased serum metal ions following MoM THA with a straight stem 57 months following implantation.

**Conclusion:** In the literature there are still controversies between 1- or 2-stage bilateral THA, where recent meta-analyses suggest superior results for 1-stage THA in terms of major systemic, cardiovascular or pulmonary complications. The current series also showed that 1-stage bilateral THA seems to be a safe and reliable procedure in selected patients without multiple co-morbidities. Further, short stem THA seem to be of advantage compared to straight stem THA concerning clinical performance.

## P13 Short stems

### P13-297

EARLY EXPERIENCE WITH THE EVOLUTION FEMORAL STEM  
Donaire-Hoyas, D.\*<sup>(1)</sup>; González Gutiérrez, J. A.<sup>(1)</sup>; Martínez-Espinosa, M.<sup>(1)</sup>; Ruiz-García, S. P.<sup>(1)</sup>; Martínez-Martín, J. A.<sup>(1)</sup>; Albert-Llilbarri, A.<sup>(1)</sup>  
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**Introduction/objectives:** For years, new types of short-stem have been appearing on the market. Following this philosophy from primary implants of recognized solvency have appeared what we could call "shortened stems". One of them is the Evolution stem (JRI, Sheffield, UK) derived from the Furlong stem and which is the purpose of the present study.

This study is to describe our early results and experience with this new shortened stem, evaluating: quality of life, functionality, survival and radiological evolution of the implant.

**Methods:** In a period of 5 years 121 stems have been implanted in 116 patients, the average age of the patients is 48 years with a range between 23 and 69 years. 85 patients were men and 36 women, 61 stems were implanted in the left side, 60 in the right and in 5 patients they have a stem in both hips. The mean follow-up of the study is 31.1637 months

**Results:** The mean of the WOMAC Score before de operation is 59.07 and 3 months after de operation is 27.90. The mean for the Harris Hip Score before the operation is 44,80 and three months after the operation 79,81 . As complications we had 2 infections, not appreciating any other complication to today's date  
The analysis of the mean implant survival with the Kaplan-Meier estimate method is 57,928 (confidence interval of 95% limits 56,312 -59,543) for revision for any reason as end point

**Conclusion:** The short-term results of this stem is satisfactory and equivalent to those obtained with the primary Furlong stem in equivalent short-term studies.

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## P13 Short stems

### P13-170

COMPARATIVE OBSERVATIONAL STUDY OF STEMLESS HIP ARTHROPLASTY VERSUS TRADITIONAL IMPLANTS AT 30 MONTHS OF FOLLOW UP

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**Case Study:** Background: The aim of this retrospective case-control study is to evaluate clinical and radiographic results of short stems compared with traditional hip prostheses.

**Methods:** 46 short stems (SS) and 50 traditional stems (TS) were selected. All the stems were implanted by the same surgeon by posterior approach because of primary osteoarthritis, post-traumatic osteoarthritis and avascular necrosis. All the patients were compared clinically (HHS, WOMAC, VAS, SF-12) and radiographically (offset, CD angle, limb length discrepancy, cup inclination, subsidence, osseointegration, heterotopic ossification). Radiographic evaluations were carried out by three different blinded surgeons. A statistical analysis was performed (Chi-square, T-Test, Mann-Whitney).

**Results:** At a mean follow-up of 30 months all the implanted stems were well positioned and osseointegrated. In both the groups there has been a marked improvement in pain ( $p < 0.001$ ) with a statistically significant advantage in the SS group for WOMAC (37.1 vs 26.0;  $p < 0.001$ ; PS adjusted 0,008) and in part for HHS (36.2 vs 29.8;  $p < 0.001$  PS adjusted: 0,092). The radiographic evaluations, with high concordance correlation between the three blinded surgeons (ICC consistently  $> 0.80$ ), showed no significant differences in the restoration of the articular geometry, with a reduction of cortical hypertrophy (2% SS vs 7% TS) and peri-prosthetic stress-shielding ( $p < 0.05$ ) in the SS group. On the other hand, SS were more related to limb length discrepancy (61% vs 33%;  $p < 0.05$ ). No major complication were recorded in the two groups.

**Conclusions:** Short stems showed to be comparable or better than traditional implants at short term follow up.

## P13 Short stems

### P13-221

SHORT VERSUS CONVENTIONAL FEMORAL CEMENTLESS STEM IN TOTAL HIP ARTHROPLASTY: A PROSPECTIVE NON-RANDOMIZED COMPARATIVE STUDY.

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**Introduction/objectives:** New short stems have been developed pursuing the goal of mini-invasiveness in primary total hip arthroplasty (THA). We aimed to compare the clinical and radiographic results of a new cementless short stem with a conventional one in patients undergoing primary THA at med-term follow-up.

**Methods:** In 2010, 400 patients (M:F=215:185) (418 hips) underwent primary THA with GTS stem and 330 patients (M:F=117:213) (337 hips) with CLS stem; the average age was 57.4 (17-88) and 64.5 (25-90) respectively. The mean follow-up was 78 (54-85) and 77 (51-86) months for GTS and CLS. Harris Hip Score (HHS) questionnaire was administered preoperatively and at the last follow-up. Postoperative radiographic assessment was performed in all patients. Survival analysis was performed with Kaplan-Mayer method.

**Results:** At the last follow-up, the mean HHS value did not differ significantly between the two groups (GTS: 96; CLS: 94,  $P=0.8$ ). Thigh pain was found in 3 (1%) hips with GTS and 16 (5%) hips with CLS ( $P < 0.001$ ). The radiographic examination showed femoral cortical hypertrophy in 4 (1%) hips with GTS and 21 (6%) hips with CLS ( $P < 0.001$ ). Intraoperative calcar infractions occurred in 6 (1%) hips with GTS and in no case with CLS ( $P=0.07$ ). At 5 years of follow-up, the cumulative survival rate for any cause of revision was 98.1% (IC95% 97.4-98.8) for GTS and 98.8% (IC95% 98.2-99.4) ( $P=0.44$ ) for CLS, while for aseptic loosening was 99.5% (IC95% 99.2-99.8) for GTS and 99.7% (IC95% 99.7-99.7) for CLS ( $P=0.7$ ).

**Conclusion:** GTS stem showed similar results of CLS stem in terms of functional and radiographic outcomes and mid-term survival in patients undergoing primary THA, with a lower risk of thigh pain and femoral cortical hypertrophy.

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## P13 Short stems

### P13-528

SHORT FEMORAL STEM HEMIARTHROPLASTY FOR A SUBCAPITAL FRACTURE IN A PATIENT WITH A RETROGRADE INTRAMEDULLARY NAIL

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**Case Study:** Aim: The purpose of this poster is to report the case and a solution for a 78-year-old female with a subcapital fracture of her right hip in the context of an ipsilateral total knee arthroplasty and an intramedullary nail implanted in the femur after a supracondylar fracture three years before.

**Methods:** Considering patient's characteristics and physical demand, a partial arthroplasty was decided to implant. During preoperative planification it was observed that the available nonoccupied proximal femoral dyaphysis was not long enough for a conventional prosthetic stem. Thus, an uncemented short stem (GTS Biomet) was chosen for cementation and implantation instead of the removal of the previously implanted femoral hardware. To reduce the biomechanical stress between the prosthesis and the nail it was decided to implant a prophylactic osteosynthesis plate overlapped to both femoral implants.

**Results:** The immediate postoperative evolution was satisfactory and uneventful, and the patient was permitted to bear weight the day after surgery. No major complications happened. One year after surgery the patient has only occasional mild pain when walking, reaching 80 degrees of flexion and 15 of abduction, and she needs a cane in the same way than before the fracture scoring 14 points in the Merlé-D'Aubigné hip score.

**Conclusions:** The use of a prosthetic cemented short stem in an elderly patient with a subcapital femoral fracture with not enough free space for a standard stem because of medullar occupation has shown to be a feasible option instead of the removal of the implanted femoral hardware with good clinical results at short term evolution, and, furthermore, the implant overlapping can be helpful to avoid perimplant fractures.

## P13 Short stems

### P13-445

EXPERIENCE MORE THAN FIVE YEARS OF CONSERVATIVE STEM GTS

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**Introduction/objectives:** Although different works have been published collecting the experiences of the use of conservative stems, we publish our preliminary experience in this type of offshoots, but there is no long term experience with these conservative offshoots. We present our experience over 5 years of the use of the conservative rod GTS-Zimmer-Biomet in THA, and discuss some aspects of surgical techniques and preliminary clinical results.

**Methods:** Between November 2010 and March 2013, 121 patients received 127 primary THAs with GTS-Zimmer-Biomet prostheses. The GTS-Zimmer-Biomet stem is made of forged titanium alloy. Thirteen stem sizes were used, as well as standard compensation at 133 ° and lateralized offset at 122 ° for each size. The acetabular component used was an Exceed ABT Zimmer-Biomet semi-spherical cup with an E1 edge of 10 ° polyethylene, to increase the upper side cover and a ceramic head.

**Results:** During the operation there was only one intraoperative complication, a crack of the femoral calmo and it was fixed with a screw osteosynthesis in the tracing. There were no postoperative complications: there were no infections, no blockages, no venous lesions or nerve injuries. But if there was a case of placement of the stem in varus which forced to make the replacement a year of placement.

**Conclusion:** The result of the GTS Zimmer-Biomet stem after more than 5 years of follow-up has shown a good result.

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## P13 Short stems

### P13-185

#### NONCEMENTED TOTAL HIP ARTHROPLASTY FOR OSTEO NECROSIS OF THE FEMORAL HEAD IN YOUNG PATIENTS USING SHORT STEM

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**Introduction/objectives:** Total hip arthroplasty has become a common procedure with good long-term results. However in young patients with osteonecrosis of the femoral head (ONFH), short-stem total hip arthroplasty (THA) could allow a potential advantage in preserving metaphyseal bone-stock, when revision surgery might become necessary. The purpose of this retrospective study was to evaluate the clinical course of and the results of short-stem THA for ONFH in young patients using Mayo stem (Zimmer, Warsaw, USA).

**Methods:** This study included 25 patients (29 hips) undergoing the total hip arthroplasty using the Mayo conservative hip between 2003 and 2008. All were able to follow up for more than 60 months and of an age of less than 40 years with osteonecrosis of the femoral head. There were 8 females and 17 males. The mean age was 33.8 years old (range 24-39 years old), the mean follow up was 74.4 months (range 60-96 months). Japan Orthopaedics Association function of the hip joint score (JOA score) was recorded. Postoperative radiographs were evaluated for bone-implant fixation and osteolysis. Further analysis correlated clinical findings with this implants predefined characteristics.

**Results:** The clinical and functional results improved significantly ( $p < 0.001$ ). At latest follow-up, mean JOA score was 95 points. 28 hips showed bone ingrowth fixation of the femoral components. One patient had revision surgery related to subsidence and leg length discrepancy. Dislocation occurred in two cases.

**Conclusion:** We conclude that the Mayo Stem stabilizes after 74.4 months and achieves good middle-term clinical results in most cases.

## P13 Short stems

### P13-101

#### BILATERAL THR WITH SHORT STEM IN A PATIENT WITH DIAMOND BLACKFAN ANAEMIA

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**Case Study:** Diamond Blackfan Anemia is a congenital disease which is characterised by a medullary hypoplasia of the red series. Described in 1938 by Diamond and Blackfan, it generally appears in the first years of life as a severe anemia, macrocytosis, reticulocytopenia and a normal bone marrow cellularity, with absence of erythroid precursors, which reverts in 70% of patients with high doses of corticoids, managing a hematocrit (Hto) between 18% and 25%. Around 50% also show physical abnormalities like craniofacial, renal and cardiac alterations, short stature (very characteristic), short neck, low implantation of hair and ears, thenar hypotrophy, imbalance arm/forearm, Klippel-Feil Syndrome and Sprengel's Deformity, among others.

We present a 24-year-old-female, 138 cm tall, who was diagnosed with Diamond Blackfan Anemia at the age of 14, with diagnosis of bilateral NOA of the hip, who was treated with Bilateral Cementless THR with short stem, with a difference of 3 months between them, those who did not authorize the surgery simultaneously in one time because of the clinical characteristics described, performed a strict monitoring for endocrinology and hematology.

There is no specific bibliography on THR in patients with Diamond Blackfan Anemia, but we could include it in those patients who suffer the NOA after effects of the use of corticoids. A bilateral cementless THR with short stems was performed by means of posterolateral approach, using small components (cups N° 46 and short stems N° 6), with 24 months of follow-up. The patient is now without pain, is asymptomatic and has complete mobility and excellent walk.

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## P13 Short stems

### P13-102

#### THE USE OF THE SHORT STEM IN THR WITH SEVERE FEMORAL DEFORMITY.

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**Case Study:** The use of short stems in cementless THR is spreading fast. Its main objective is to preserve femoral bone stock by means of purely proximal fixation. We present a case of a woman where the choice of this type of implant was one of the few alternatives for total hip arthroplasty due to the enormous sequelar femoral deformity, as a result of various osteotomies done in her childhood for having bilateral DCH. The patient is a 62-year-old female with antecedent of bilateral DCH and operated several times on both hips. On the right side she had various surgeries, including 4 revisions, the last one a femoral revision with long stem of distal fixation. The hip treated by us was the left one where various previous proximal, medial and distal femoral osteotomies had been carried out, the last one 40 years ago, leaving a great femoral residual deformity and remains of very old material. After carrying out the different imaging studies, with the corresponding measurings and preoperative planning, it was decided to perform a cementless THR with a short stem, because the use of a conventional stem would have required some type of corrective osteotomy for its positioning. A posterolateral approach (the patient had multiple previous scars), the removal of almost all the material and the positioning of a cementless THR with a short stem were carried out. With 24 months of follow-up the patient is without pain, with recovery of the length (of the limb) and walks with a slight limp. Bibliography reports a secure proximal fixation with 8 to 11 years of follow-up. With acceptable clinical and radiographic results in patients of different ages and bone quality. In this unique and special case we can say that that was the correct treatment.

## P13 Short stems

### P13-319

#### RESULTS WITH A SHORT STEM WITH PRESERVATION OF THE FEMORAL NECK WITH A MINIMUM FOLLOW UP OF FIVE YEARS

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**Introduction/objectives:** The aim of this study is to analyze retrospectively our experience using a short stem with preservation of the femoral neck and metaphyseal anchorage

**Methods:** During 2001-2012, we placed 198 short stems in 107 men and 73 women (18 bilateral). The mean age was 52.2 years (range: 22-77) at the time of surgery. The most common preoperative diagnosis was osteoarthritis. Patients with deformities of the proximal femur or dysplasia with increased femoral anteversion were excluded.

The follow-up was performed by clinical evaluation in 2017, telephone call when it was not possible or by the Shared Clinical History of Catalonia (HCCC) as a last option.

Complications and the need for surgery or for a replacement are studied. Of the 198 hips, 15 cases were excluded due to death not related to the surgical process (8 hips) or because they were lost to follow-up (7). Thus, 183 were available for this study.

**Results:** With a minimum of 5 years follow-up, an average of 94.1 months (7.84 years) was obtained with a range of 5-15 years.

There were no cases of dislocation or acute infection. The complications during this period were 3 intraoperative fractures treated conservatively, 3 post-traumatic periprosthetic fractures treated with osteosynthesis (2) or stem replacement (1), 1 massive calcar reabsorption without clinical repercussion and 1 chronic infection treated with a 2-stage replacement. 2 polyethylene inserts and 3 cups have been replaced. 3 femoral replacements were performed due to aseptic loosening

**Conclusion:** The short stem with preservation of the femoral neck used presents results and complication rates similar to the most common uncemented stems

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## P13 Short stems

### P13-91

MEASUREMENT OF INITIAL BONE PRESERVATION OF PARTIAL COLLUM SHORT STEMS ACCORDING TO ITS ALIGNMENT IN RELATION TO STANDARD STEMS USING 3D MODELS  
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**Introduction/objectives:** The surgical technique of a specific partial collum short stem advocates the use of three point fixation.  
In practice, this position could be modified for a better reproduction of the anatomy.

**Objectives**  
Estimate the initial bone preservation of partial collum short stems considering the most frequent alignments comparing with standard flat tapered wedge stem using a 3D model design.

**Methods:** 40 patients with THA using partial neck preservation short stem (Minihip®, Corin, Cironcester, UK) 1 year follow-up. Mean age was 47 years (25 - 60).  
x-rays of both hips were used to measure the stems inclination. 2 groups were classified, A = neutral =< 10 grades (23); B = varus > 10 grades (17).

The CT images were segmented in DICOM format of the sectors.  
Modelling and reverse engineering of a standard flat tapered wedge stem (Accolade® (Stryker, USA) was performed. In the 3D models corresponding to the femur with the implanted short stem, we proceeded to the subtraction of it, and to the virtual implantation of the standard stems at the same femur. This, was guided by a blind operator expert in hip surgery.

**Results:** Average of preservation of the short / standard stems was 53.2 gr (17.3 - 104.3); 8.07 ml (2.2 - 15.8).  
Difference in groups A / B was, (weight): 29.8 g, CI 95% (29.1 - 30.5) P = 0.002. Group A, average: 39.3 g (17.3 - 62.9).  
Group B: 69.2 g (18.57 - 104.3). (volumen): 4.5 cm3 CI 95% (3.7-5.2) P = 0.002. Group A, average: 5.9 cm3 (2.6 - 9.5).  
Group B: 10.6 cm3 (2.8 - 15.8).

**Conclusion:** Significant difference in bone preservation of short stems was observed compared with standard stems and was significantly higher in short stems aligned in varus.  
Considering the saving of bone, this information could be used for a more effective preoperative planning.

## P13 Short stems

### P13-423

ONE TO 5 YEARS RESULTS OF A SHORT CEMENTED FEMORAL COMPONENT  
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**Introduction/objectives:** Short stem cementless total hip replacement has gained an increased interest in the last 15 year. In 2004 a shortened version of the cemented Friendly stem (Lima LTO) was developed. The shortened version of this polished double tapered stem was studied to be implanted with a high neck cut and a fourth generation cementing technique. The tip of the device extends only 2 cm below the lesser trochanter

**Methods:** From Jan 2013 to Jan 2017 we performed 54 total hip replacement using the Friendly short stem. Mean age was 75 years (64 to 87). Mean follow-up is 2.7 years. Patients were evaluated pre and postoperatively with the HHS. On x-rays we observed and classified the quality of the cement mantle, stem alignment, subsidence, radiolucent lines, cortical hypertrophy and calcar resorption

**Results:** 7 patients died for causes unrelated to THR. 49 were available for follow up. HHS improved from a mean of 46 to 93. One patient had a traumatic femoral fracture without stem mobilization 4 years after THR and was initially treated with ORIF but 1 year later required revision with a standard cemented stem. Of the remaining 41 implants, survival rate was 100%. In all cases we saw a Barrak class A cement mantle and in 11 cases a physiologic stem subsidence less than 2 mm within the cement mantle. No bone-cement radiolucent lines, cortical hypertrophy and calcar resorption were detected. No patients complained of tight pain.

**Conclusion:** Cemented femoral components remain the gold standard for THR in old patients with porotic bone. In this small series of 54 THR, at an average of 2.7 yrs. FU, we obtained excellent results with an ultra short cemented polished stem. Short stemmed cemented hip replacement is an interesting innovation with the great advantage of easing a possible future revision

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## P13 Short stems

### P13-34

A CRITICAL APPRAISAL OF TWO PROSPECTIVELY FOLLOWED CALCAR-LOADING STEMS WITH CERVICO-METAPHYSEAL FIXATION  
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**Introduction/objectives:** Given its long-term endurance, CFP stands as the benchmark of short-stem total hip arthroplasty (THA). However, it has been scarcely compared with other short stems. Thus, we sought to compare the clinical and radiological outcome of CFP stem with the MiniHip one in a matched-controlled series, with special interest in intraoperative periprosthetic fracture (IPPF).

**Methods:** We prospectively followed 101 patients treated with MiniHip stem (Group 1) and 89 with CFP stem (Group 2) operated between 2011-2015. No significant demographic differences were observed between both groups, except for a more predominant Dorr A morphology in group 2 (p=0.027). Median follow-up was 47.5 months (IQR: 20.8-80.16). Radiological parameters were measured and a logistic regression model was created to evaluate factors associated with IPPF.

**Results:** No significant differences were observed in terms of loosening, instability, restoration of biomechanics and IPPF. We observed 6 IPPFs (6/190=3.16%), 2 in group 1 and 4 in group 2. After adjusting for confounders, CFP was not associated with a greater risk of IPPF (OR 3.23; 95%CI 0.250-42.034, p=0.368) when compared to MiniHip. Prior acetabular fractures were associated with IPPF (OR 66.85; 95%CI 1.142-3911, p=0.043). Compared to Dorr A femurs, Dorr B ones appeared as protective against IPPF (OR 0.039; 95%CI 0.001-1.109, p=0.058). Valgus alignment produced a borderline risk of IPPF (OR 20.59; 95%CI 0.870-487.221, p=0.061) when compared to neutral alignment.

**Conclusion:** Being an ostensibly shorter stem, MiniHip showed similar radiological outcomes to CFP at short- to mid-term follow-up. Given that CFP doubled the incidence of IPPF, surgeons should be cautious with alignment of this particular design, especially in Dorr A femora.

## P13 Short stems

### P13-77

MID-TERM RESULTS OF THE SHORT STEM TOTAL HIP ARTHROPLASTY IN PATIENTS WITH OSTEONECROSIS OF THE FEMORAL HEAD.  
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**Introduction/objectives:** To evaluate the clinical and radiographic mid-term results of the short stem THA in patients with ONFH.

**Methods:** We reviewed 85 cases of ONFH who underwent Metha® stem between November 2010 and November 2012. Bone trabeculae development and radiolucent line were reviewed using Gruen's classification. The HHS was recorded at 6 months postoperative then yearly for evaluating the clinical results.

**Results:** The mean age of patient was 44 years (21-68) with the mean BMI of 22.7 (15.1-32.3). The mean follow-up period was 69.3 months (60-84). The mean HHS was significantly improved from 44.7 preoperatively to 99.4 and 99.6 at 60 and 72 months postoperative respectively (p<0.0001). There were 4 cases of intraoperative femoral fractures and these were treated with cerclage wires, no further subsidence was observed. There was one case of distal stem perforation that had stable bone ingrowth and there was one case of 5 mm. subsidence then stable at 3 months postoperatively. The radiographic change around the stems showed bone trabecular development at zone 1 (63.5%), 2 (68.2%), 3 (15.7%), 4 (1.2%), 6 (97.6%) and 7 (81.2%). There was 1 case which radiolucent line was observed at zone 1 and 7. There were 2 cases of revision, one for femoral stem due to periprosthetic fracture from trauma and one for cup revision from aseptic loosening. Kaplan-Meier survivorship with the end point of stem revision for any reason was 98.8% and with the end point of stem revision for aseptic loosening was 100% at 7 years.

**Conclusion:** The clinical and radiographic mid-term results of Metha® stem in patients with ONFH were promising. Its design enables preservation of the bone stock and the bone trabeculae appear to confirm the assumption of proximal force transmission.

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## P14 Surgical approach

### P14-577

THE LEARNING CURVE OF THE DIRECT ANTERIOR APPROACH WITHOUT TRACTION TABLE IN TOTAL HIP REPLACEMENT; USING THE LC-CUSUM METHOD

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**Introduction/objectives:** The surgical approach for total hip replacement (THR) depends on surgeon preference or the preference and experience of the surgeon with a specific approach. The aim of this study was to analyse the learning curve of the Direct Anterior Approach (DAA) using the Cumulative Sum Control Chart (LC-CUSUM).

**Methods:** A retrospectively collected database of 400 THR's using the DAA (January 2010- September 2014) at a single centre by a single surgeon. The learning curve was analysed by determine duration of surgery, blood loss and number of complications.

**Results:** All 400 primary THR's were reviewed. Based on the LC-CUSUM, duration of surgery and surgical failure, the learning curve plateau was achieved after the 19th surgery and the curve substantially follows a negative trend. The average duration of surgery changed significantly for the first hundred (78 minutes) to the last hundred (61 minutes), as well as a significant decrease in blood loss. A total of 17 (4.25%) complications occurred, with reduction of the complication rate as surgeons' experience increases.

**Conclusion:** Our study did not show the steep learning curve as previously described in literature. The number of complications was small, and there was significant decrease in duration of surgery, blood loss and number of complications as surgeon's experience increases. We suggest that the educational environment of a teaching hospital, combined with the use of the DAA is as standard approach for all primary THR's and supervision of experienced surgeons, contribute to the favourable learning curve with a low complication rate.

## P14 Surgical approach

### P14-106

HIP MUSCLE POWER RECOVERY AFTER HIP REPLACEMENT USING ANTERIOR-BASED MUSCLE-SPARING APPROACH (ABMS) IN ELDERLY FEMORAL NECK FRACTURE; A PROSPECTIVE STUDY IN 40 PATIENTS

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**Introduction/objectives:** The early rehabilitation and mobilization after hip arthroplasty (HA) in elderly femoral neck fracture (FNF) patients significantly reduces the post-operative morbidity and mortality. The approach without the muscle detachment has been proven to improve the early postoperative functional outcomes in cox-arthrosis patients. However, there was limited literatures on elderly FNF. This study aimed to report the hip muscle strength recovery after our anterior-based muscle-sparing approach (ABMS) in elderly FNF

**Methods:** Forty elderly unilateral FNF patients who underwent HA with ABMS, was conducted. The primary outcomes were hip flexion and abduction power at each follow-up period. The contralateral muscle power, measured at three and six months, was used as the control value. The perioperative data and complications were recorded

**Results:** 32 patients underwent bipolar hemiarthroplasty (BHA) while 8 other patients received total hip arthroplasty (THA). The hip abduction power was recovered to control value at 6 weeks (99.0±6.1%; 95%CI 86.1-111.8). The hip flexion power was recovered back to control at 3 months (108.5±5.6%, 95%CI 96.8-120.2). No iatrogenic nerve injury was found. The intraoperative femoral fracture (IFF) was found in 7 patients (17.5%), and was significantly related to the early period of learning skill (first 11 cases; p<0.01). BHA had non-significant higher IFF than THA (8 versus 0; p=0.31)

**Conclusion:** After ABMS, the hip muscle could recover to the baseline value within three months. The IFF could be significantly improved with the learning skill, the adequate posterior soft tissue release, and gentle manipulation of the hip joint. BHA might relate to higher risk of IFF due to difficult reduction from large femoral head diameter

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## P14 Surgical approach

### P14-418

DIRECT ANTERIOR TOTAL HIP ARTHROPLASTY. LEARNING CURVE

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**Introduction/objectives:** In recent years some surgeons have changed their preferences approaches to the direct anterior approach attracted by the theoretical advantages of this approach. Using a new surgical approach is a challenge for the orthopaedic surgeon who requires prior training in order to minimize complications related to learning curve. The main complications reported in the direct anterior approach are neuroapraxia of the femoral cutaneous nerve, femur fracture and malposition of the femoral component. Some previous studies have estimated at 50 the minimum number of cases that a single surgeon need to solve the learning curve.

**Methods:** This study is related to the first 200 total hip arthroplasty performed in the Vall d'Hebron Hospital, Barcelona. The surgeries were performed between 2014 and 2017. Radiological analysis was based in the position of the acetabular and femoral component. Clinical analysis was assessed by VAS scale, Harris Hip Score, the Oxford test. Besides surgical time, bleeding, time to hospital discharge and complications were reported.

**Results:** All patients presented significant clinical improvement at all scales. Radiological analysis shows 90% of acetabular cups were found placed in the safe area of Lewinnek. Fifteen percent of the femoral components showed more than 5° of varus. Leg length discrepancy average was 5 mm. The average operating time was 90 minutes. Major complications were: Three dislocations, 1 postoperative hematoma, 2 false femoral routes, 1 neurological injury, 2 infections.

**Conclusion:** This approach has been associated with a significant increase in the complications that have been attributed to the learning curve. The most frequent complications during the learning curve are false routes, dislocations and increased surgical time

## P14 Surgical approach

### P14-569

NO DIFFERENCE IN PATIENT REPORTED OUTCOMES BETWEEN DIRECT ANTERIOR AND MINI POSTERIOR APPROACHES TO THA AT 3 MONTHS POST-OPERATIVELY.

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**Introduction/objectives:** Advocates of the anterior approach of total hip arthroplasty have consistently stated that this approach leads to faster recovery and an improved outcome post-operatively.

**Methods:** We tested that by comparing 3 month Patient Reported Outcomes using the Hip disability and Osteoarthritis Outcomes Score at 3 months. We used the OrthoArizona database of patient reported outcomes. In our cohort study we compared 645 anterior approach primary total hip replacements from 3 separate surgeons to 114 posterior approach primary total hip replacements from two different surgeons.

**Results:** We found that the average HOOS score for posterior total hip arthroplasty at 3 months was 82 while the average HOOS for anterior hip replacements was 83. With a t-score of 1.06, the null hypothesis was confirmed.

**Conclusion:** We conclude that there was no statically significant difference between the anterior and posterior approach to primary total hip replacement in patient reported outcome.

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## P14 Surgical approach

### P14-404

ARTERIAL INTIMAL DAMAGE IN DIRECT ANTERIOR TOTAL HIP ARTHROPLASTY: REPORT OF FOUR CASES

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**Introduction/objectives:** Arterial injury is rare during total hip arthroplasty (THA) and this may make the diagnosis and treatment extremely challenging. To our knowledge, there is no previous report of femoral arterial injury during THA via direct anterior approach.

**Methods:** A thousand primary THAs were performed by the orthopedic department of Imam Khomeini Hospital, Tehran University of Medical Sciences Between 2013 and 2017. Four cases of vascular injuries during surgery were recognized. Demographics of the patients, type of injury, time to diagnosis, and management approaches were recorded.

**Results:** Four arterial injuries developed in 4 separate patients (3 female and 1 male patient). The time of recognition of injury was 0-10 hours after surgery. All injuries involved intimal damage, and all of them were managed by thrombectomy and bypass with venous interposition or onlay grafting by a vascular surgeon. One of the patients died because of developing disseminated intravascular coagulation (DIC) secondary to blood transfusion for massive bleeding. Two patients had dysplastic hip and two patients had primary hip degenerative disease

**Conclusion:** The incidence of vascular complications associated with THA via direct anterior approach was remarkably low in this series in a high volume orthopedic service. The only type of injury in our cases was intimal damage of femoral artery. We believe that a sharp anterior Hohmann retractor which is routinely placed along the anterior acetabular rim, beneath the tendon of femoral rectus muscle may cause the injury. Therefore, we recommend using blunt retractors in this site. Furthermore, we recommend to check the distal arterial pulses immediately after surgery in order not to delay diagnosis

## P14 Surgical approach

### P14-537

ANTERIOR MINIMALLY INVASIVE APPROACH (AMIS) VERSUS LATERAL APPROACH : COMPARISON OF MAJOR INTRAOPERATIVE COMPLICATIONS DURING IMPLANTATION OF PRIMARY TOTAL HIP ARTHROPLASTY, A 10 YEARS RETROSPECTIVE STUDY

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**Introduction/objectives:** Introduction: We checked major intraoperative complications during implantation of primary total hip arthroplasty (THA) in a 10 years period in our hospital. We compared anterior minimally invasive surgery approach (AMIS) versus lateral approach. Objectives: Two orthopedic surgeons performed 1023 primary total hip arthroplasty during period 2007 until 2017. There were 203 operations done by AMIS technique. Is there any difference of prevalence of major intraoperative complications between two surgical approaches?

**Methods:** Methods: We analyzed retrospectively data of all 1023 patients for major intraoperative complications.

**Results:** Results: We had 17 major complications, using lateral approach. 6 of them happened during removal of osteosynthetic material when performing total hip arthroplasty after healed pertrochanteric fracture. The prevalence of major intraoperative complications using lateral approach during 10 years period was 2,06%. We had 4 major intraoperative complications using AMIS approach during 10 years period. In the first 2 years we had 1 periprosthetic fracture of femur and 2 protrusions of acetabular cup. After completed learning curve of the first 50 patients, we had only 1 abruption of great trochanter. The prevalence of major intraoperative complications using AMIS approach during 10 years period was 1,97%.

**Conclusion:** Conclusion: We didn't found significant difference of prevalence of major intraoperative complications between AMIS approach and lateral approach. After completing AMIS learning curve in the first two years, the prevalence using anterior minimally invasive approach dropped to 0,72 %. AMIS approach is safer approach when the surgeon has gained enough experience during learning curve.

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## P14 Surgical approach

### P14-456

HOW TO OVERCOME THE LEARNING CURVE IN DIRECT ANTERIOR APPROACH?

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**Introduction/objectives:** Direct anterior approach (DAA) hip replacements have recently gained popularity and also appears to be associated with higher incidence of complications, especially during the learning curve period.

**Methods:** We reported the learning curve and complications of DAA using regular operative table in the first consecutive 100 hips of a single surgeon in adapting this approach to the institute. All procedures were performed with the use of fluoroscopic guidance on supine position. Prospective data was collected following a published protocol. In preparation for the use of DAA, the surgeon had 2-years DAA fellowship training and mentoring by surgeons who had experience with this technique.

**Results:** At 6-week follow up, the mean HHS and WOMAC were significantly improved when compared with the pre-operative period. Ninety-eight percent of acetabular components were in the Lewinnek zone. The mean blood loss was 250 cc (range: 150-900 cc). The mean operative time was 100 min (range: 85-110 min). There was no femoral stem subsidence or loosening in our series. There was no leg length discrepancy more than 1 cm in our series. The time of surgery and blood loss had been significantly decreased with the increase of surgeon experience. There was no complication required additional surgery. There was no hip dislocation however, we observed two intra-operative complications including one calcar fractures and one tip of greater trochanter fracture. One patient had a superficial wound delayed healing with a bikini incision.

**Conclusion:** DAA had some distinctive complications during its vertical learning curve for the beginners. However, in our present study showed that incidence of major complications could be controlled with an increasing surgeon's experience and training.

## P14 Surgical approach

### P14-393

TECHNIQUES OF CAPSULAR REPAIR AND LENGTHENING IN MINI POSTERIOR TOTAL HIP ARTHROPLASTY

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**Introduction/objectives:** Choice of the best mini invasive surgical approach for total hip replacement remains a controversial topic. The posterior approach is traditionally associated with a higher dislocation rate and the obligation of postoperative restrictions. Soft tissue repair reduces the risk of dislocation however, posterior closure it is often challenging because of capsular and external rotator contractures. A tension free repair is seldom achieved with most previously described techniques. In this retrospective single surgeon investigation, we aimed to determine the efficacy of a new capsular lengthening technique.

**Methods:** A total of 925 mini posterior total hip replacements performed between 2009 and 2015 were retrospectively reviewed. Two original types of capsulorrhaphy to decrease tension of the repaired tissues were employed. Absence of posterior envelope stretch during flexion and internal rotation was confirmed intraoperatively with a dynamic test. No postoperative restrictions were used.

**Results:** Capsular lengthening with one of the described techniques was required in over 50% of cases for a tension free closure. Three patients dislocated in the 867 reviewed patients (0.35%), one of them requiring revision for instability (0.11%).

**Conclusion:** This soft tissue repair technique after mini posterior-approach THR is technically easy, provides a tension free closure and a low dislocation rate.

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## P14 Surgical approach

### P14-406

#### PRELIMINARY RESULTS OF HIP REPLACEMENT WITH A MINIMALLY INVASIVE TISSUE SPARING POSTERIOR SUPERIOR APPROACH.

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**Case Study:** Objectives: Aim of the following study is to evaluate the short-term clinical and radiographic results in patients operated in our hip replacement department using a minimally invasive Tissue Sparing Posterior Superior (T.S.P.S.) approach.

**Methods:** 25 patients with primary coxarthrosis who underwent total hip replacement surgery by means of the T.S.P.S. approach were included in the study between September 2016 and February 2017. All candidates were treated with the same prosthetic implant. Patients were assessed preoperatively, at 3 months and 6 months of follow-up using Harris Hip Score and RX of the pelvis. The hematic values of hemoglobin were taken pre and post op. Finally, was considered the time between the surgery and the return to walking without aids.

**Results:** No perioperative complication was observed. The radiographies showed no signs of malposition or loosening of the prosthetic components. An early increase in Harris Hip Score was observed in all patients. All patients were able to ambulate with 2 anti-brachial agents on the first post-operative day. The observed blood loosening allowed a limited use of blood products during hospitalization.

**Conclusions:** The surgical technique used permits an early mobilization of the hip and a progressive load from the first post-op day and provides a good vision of the acetabulum and the femur during the operation. A long-term study will be needed to confirm the encouraging results obtained so far. The use of the minimally invasive T.S.P.S. approach has shown good short-term clinical and radiographic results.

## P14 Surgical approach

### P14-557

#### EARLY RECOVERY OF MUSCLE POWER AND PROPRICEPTION IN PATIENTS AFTER TOTAL HIP ARTHROPLASTY: A COMPARISON OF THREE DIFFERENT SURGICAL APPROACHES

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**Introduction/objectives:** The aim of this study was to compare the MIS anterolateral approach (Rottinger) in lateral position with the standard anterolateral approach in supine position (Bauer) and the mini posterolateral approach with regards on early outcome after surgery concerning Harris hip score, abductor muscle power and proprioception

**Methods:** The prospective, non-interventional observational study investigated 50 consecutive patients with MIS anterolateral approach (MAL) in lateral position, 25 consecutive patients with standard anterolateral approach (SAL) in supine position and 25 consecutive patients with mini posterolateral approach (MPL) in lateral position. Three very experienced high-volume surgeons, each with recognized reputation performed their favourite approach only. Preoperative and postoperative procedures including rehabilitation were for all patients in all details the same. Data registration (Harris- Hip-Score, abductor muscle power (MicroFet2, CompuFet), proprioception (Posturomed Rasev)) for all patients happened one day before surgery, 8 days after surgery and 5 weeks after surgery. For statistical evaluations the "Multivariate Regression Analysis" ("Ordinary-Least Squares", Stata 8 software) and "Difference-in-Difference" Method were used.

**Results:** MAL was superior to SAL and MPL in all benchmarks postoperatively. The differences in Harris-Hip-Score and proprioception decreased very little from first to second postoperative data registration whereas the differences in muscle power still increased.

**Conclusion:** To safe the muscle integrity by use of MIS anterolateral approach in total hip arthroplasty leads to improved early outcome for patients concerning Harris-Hip-Score, abductor muscle power and proprioception

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## P14 Surgical approach

### P14-100

#### DIRECT ANTERIOR APPROACH WITHOUT TRACTION TABLE FOR TOTAL HIP REPLACEMENT - SINGLE SURGEON LEARNING CURVE

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**Introduction/objectives:** The direct anterior approach (DAA) remains controversial as a technique for total hip replacement (THR). This method may be associated with a faster recovery, reduced pain and fewer surgical complications however, it has been recognised as having a steep learning curve. Some studies have suggested a higher complication rate especially with femoral fracture and lateral cutaneous nerve injury during the first 50 cases performed. The purpose of this study is to evaluate the experience of a single surgeon in using this approach using a regular operating table.

**Methods:** The first 70 THRs performed over 5 years were reviewed. Cementless stems were used in all cases. No specific traction table was used. There were 9 males and 53 females, with a mean age of 48 years (range 22-82). Post-operative outcomes such as complications, revisions, length of operation and stay, blood transfusions and pain score were documented. Radiographic data and Patient Reported Outcome Measures (PROMs) are being evaluated.

**Results:** The was 1 dislocation and 1 femoral nerve injury (temporary). Other complications included 3 cases of leg length discrepancy and 5 patients with short term anterior thigh pain. No revisions were performed. There was a decline in length of stay with experience ( $r=-0.296$ ,  $p=0.014$ ) however, there was no correlation with operative time ( $r=-0.091$ ,  $p=0.518$ ). The pain scores and transfusion rates were both low in all cases.

**Conclusion:** This data demonstrates that direct anterior approach using a regular operating table is safe during the learning curve in this setting.

## P15 The paediatric hip

### P15-591

#### PREVENTIVE SURGERY OF THE HIP IN CHILDREN WITH CEREBRAL PALSY.

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**Introduction/objectives:** A long-term muscle imbalance in children with cerebral palsy leads to the formation of coxa valga and, as a consequence, to the development and progression of decentralization, subluxation and dislocation of the hip.

**Aim:** to present treatment options for preventing the development of instability of the hip in children with cerebral palsy.

**Methods:** 110 children with cerebral palsy were examined, aged 2-12 years; according to GMFCS classification: 45 patients (40.91%) with level II, 37 (33.64%) with level III, and 28 (25.5%) - IV (the study did not include children with I and V levels of GMFCS). The average follow-up period was 6.7 years. Children were examined before and during the treatment: clinical, radiological, neurological, biomechanical, ultrasound, dynamometry and electromyography of muscles evaluations were performed.

**Results:** Conservative treatment was performed to children aged from 1 to 5 years to reduce muscle strength by immobilizing them in orthoses with positive result in 16%. If the treatment was unsuccessful, botulinum toxin was injected into the target muscles under ultrasound control, followed by surgery in soft tissues of the lower limbs. With the progression of coxa valga in 22 patients (40 joints), temporary or persistent hemiepiphyseodesis of the medial part of the growth plate of the femoral head, a screw fixation was performed with or without bone grafting. In 7.5% cases surgery didn't give the expected result.

**Conclusion:** The obtained data show satisfactory results of preventive hip surgery in children with cerebral palsy. There is a need of providing further studies to clarify the indications for using temporary or permanent hemiepiphyseodesis of the growth plate of the femoral head in children with cerebral palsy.

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## P15 The paediatric hip

### P15-588

#### THE MODELLING RESECTION OF THE FEMORAL HEAD IN CHILDREN.

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**Introduction/objectives:** Hip pathology in children (avascular necrosis of the femoral head, pathological and congenital hip dislocation, posttraumatic deformation of the proximal femur) often lead to femoral head deformation. In these cases, modelling resection of the femoral head can be performed. Aim: to show the results of the using the resection of the femoral head in children.

**Methods:** 44 patients (26 girls and 18 boys), aged 10 to 18 years. The long-term results of the resection of the femoral head were followed up from 5 to 20 years (the average term of 8.4 years) and evaluated basing on clinical, biomechanical and radiographic criteria.

The method of the modelling resection of the femoral head:

- 1st stage: soft-tissue decompression of hip joint;
- 2nd - anterior or lateral access to the hip, with greater trochanter osteotomy;
- 3rd - modelling resection of the femoral head;
- 4th - if indicated, intertrochanteric corrective osteotomy of the femur was performed.

In the postop. lower limbs discharge was carried out for 1.5-2 months with the following CPM-therapy movements.

**Results:** The results of the treatment in long-term were the following: good in 31.8% (14 patients), satisfactory in 40.9% (18 patients) unsatisfactory in 27.3% (12 patients).

**Conclusion:** Indications for modelling resection of the femoral head are: significant bone-cartilaginous growths in the area of the femoral head and its saddle-shaped deformation, impeding the femoral head reduction. Unsatisfactory results were substantially due to the initial condition of the hip, while performing the modelling resection of the femoral head and particularities of the main disease.

## P15 The paediatric hip

### P15-358

#### NEONATAL PARAPLEGIAS. ORTHOPAEDIC AND FUNCTIONAL HIP ASPECTS. WHAT DO NOT WE HAVE TO DO? A CASE REPORT

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**Case Study:** Introduction: Paraplegia consists of motor weakness that affects the lower extremities, it produce a loss of functionality, part of them are caused by ischemic factors

**Methods:** A 2-year-old female patient was treated at the Garrahan Hospital of Pediatrics, with a diagnosis of ischemic neonatal paraplegia and a dislocation of the left hip, by an open reduction, shortening and varization 9 years later, it evolves to a hip rigidity and a perimplant fracture. At 13 years old, our patient, was operated due to column problems making an arthrodesis from T3 to iliac. At this time the physical examination showed an attitude of flexo adduction of the left thigh by coxa vara. 5 years later, she presented a reduction of functionality, deformity in both legs, adduction and flexion of the left one, attitude in flexo abduction the other one. Surgical treatment was a rotating osteotomy of the left femur and fixation with LCP plate, and for the right hip, a varus osteotomy

**Results:** 5 years later, the patient is 23 years old, and presents dislocation of the left hip, a limitation to the hip flexion at 30 degrees and impossibility to sit down. As a final alternative, it was decided to perform a Girdlestone, in order to achieve at least 90° flexion.

**Conclusions:** In these patients, hip dislocations, should not be reduced, because there would be re-dislocated. The therapy to be used initially is aimed at reducing deformities with adequate physiotherapy planning and control, progressive casts and alignment surgeries, but it is also necessary to know that they can improve in the first year of life. That's why we do not recommend hip surgery until neurological stabilization. Our conduct must be aimed at achieving a better and faster functionality

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## P15 The paediatric hip

### P15-278

#### TREATMENT OF CHILDREN WITH DYSPLASTIC COXARTHROSIS

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**Introduction/objectives:** The prevalence of dysplastic coxarthrosis in adolescents determines the high medical and social significance of its prevention and treatment. In performing a total hip replacement in young patients with dysplasia, two significant problems manifest themselves: 1. the bevelled and shortened arch of the acetabulum causes significant technical difficulties; 2. the endoprosthesis longevity depends directly on the motor activity of patients, their age and lifestyle. Objective: to evaluate the results of surgical treatment in children with dysplastic instability of the hip.

**Methods:** In the department of the hip joint pathology of the Turner Research Institute for Children's Orthopedics more than 500 triple pelvic osteotomies have been performed, and depending on the specific anatomical situation, they were followed by arthrotomy and/or osteotomy of the femur.

**Results:** The maximum follow-up period amounted to 28 years. All patients reported pain reduction and the increased range of motion. Radiographic dynamics of the formation of the joint space, restoration of shape and structure of the proximal femur and acetabulum, strongly suggests a slowdown of the progress of coxarthrosis.

#### Conclusion:

1. The prevention and/or slowdown of dysplastic coxarthrosis development may save patients from having hip replacement surgery or postpone it and reduce the frequency of this intervention if it is needed in future.
2. The preservation of the muscle function and reorientation of the acetabulum eases the fixation of the acetabular component of the endoprosthesis. This proves a positive assessment in terms of replacing one's own hip joint with an artificial one.

## P16 Trauma

### P16-38

#### MINI INVASIVE APPROACH OR OPEN TECHNIQUE WITH POLYAXIAL LOCKING PLATES IN THE TREATMENT OF PERIPROSTHETIC HIP FRACTURES. WHICH PROCEDURE IS BETTER?

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**Introduction/objectives:** Locking plates for the treatment of periprosthetic hip fractures (PHF) make minimally invasive approaches possible owing to the greater number of useful screws due to its polyaxial arrangement. Thus, there is less soft tissue damage and greater preservation of bone vascularization.

The purpose here is to evaluate the clinical and functional outcomes of patients who have undergone surgery for PHF without stem loosening using the NCB plate (Zimmer) with a mini-invasive (MI) approach in comparison to patients operated on with the classic open approach.

**Methods:** It is a prospective cohort study that includes all patients who underwent surgery for PHF Vancouver B1 and C in a university hospital between 2012-2016. Osteosynthesis with the NCB plate was performed with 2 different approaches, the MI approach and open surgery. Intraoperative clinical data, short- and long-term complications and patient functionality scores (Merle d'Aubigné Postel and Barthel scales) at 6, 24 and 52 postoperative weeks and subsequently every year, were collected. Weight bearing was authorized once bone consolidation was evidenced in the radiographic study.

**Results:** Of a total of 22 patients, 9 were operated on with the MI approach and 13 with open surgery. The mean follow-up was 32.5 months (12-56 months). The outcomes in terms of the mean surgical time (p=0.04), the number of transfusions received (p=0.05) and functionality (p=0.03) were significantly better in the MI group. No differences were found in relation to bone healing time.

**Conclusion:** Patients that undergo PHF without stem loosening with the NCB plate using the MI approach have better clinical and functional results and lower morbidity than patients who are operated on using an open approach

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## P16 Trauma

### P16-64

#### INCIDENCE OF PERIPROSTHETIC FRACTURES AFTER CEMENTLESS ALLOCLASSIC ZWEYMÜLLER HIP HEMIARTHROPLASTY

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**Introduction/objectives:** Previous studies reporting on the outcome of hemiarthroplasty using the uncemented Alloclassic Zweymüller stem have reported excessive numbers of periprosthetic fractures. This is in contrast to what is experienced by most surgeons familiar with this type of prosthesis. The aim of this study was to establish mid-term periprosthetic fracture rates after cementless Alloclassic Zweymüller hip hemiarthroplasty.

**Methods:** In this retrospective review, the medical records of a consecutive series of patients who underwent hemiarthroplasty with the uncemented Alloclassic Zweymüller stem prosthesis (Zimmer GmbH) between July 2012 and December 2015 for intracapsular femoral neck fractures were evaluated. Patients who received hip hemiarthroplasty after a pathologic fracture or failed osteosynthesis of non-displaced femoral neck fractures were excluded.

**Results:** The medical records of 522 patients (536 procedures) who underwent cementless Alloclassic Zweymüller hip hemiarthroplasty for the diagnosis of an intracapsular femoral neck fracture were reviewed after a median follow-up duration of 3.3 years (IQR 2.3-4.0). Intra-operative fractures occurred in 14 patients (2.6%). Post-operative periprosthetic fractures occurred in 17 patients (3.2%) after a median interval of 5.3 weeks (IQR 1.9-30.4). Overall, 14 patients (2.6%) underwent reoperation as a result of periprosthetic fractures.

**Conclusion:** use of the Alloclassic Zweymüller stem for hemiarthroplasty resulted in decreased rates of periprosthetic fractures compared to periprosthetic fracture rates observed in previous studies. However, additional prospective randomized studies are required to compare the safety of the cementless Alloclassic Zweymüller stem with cemented stems for hemiarthroplasty.

## P16 Trauma

### P16-390

#### TREATMENT OF PERIPROSTHETIC FRACTURES VANCOUVER TYPE B2 THROUGH THE DAA INTERVAL.

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**Introduction/objectives:** In the last two decades, the direct anterior approach (DAA) has become a standard approach for primary total hip arthroplasty (THA). The postulated advantages of the DAA are better functional recovery, earlier discharge from hospital and potentially higher quality of life. In addition, the total number of revision surgeries in THA is steadily increasing. The increasing number of DAA approaches in the last years, has also raised questions regarding possible revisions through the same interval. The aim of this study was to retrospectively observe the clinical and radiological outcome in patients with a periprosthetic fracture treated with stem revision through the DAA interval.

**Methods:** 41 patients were included in the current study. All of them had a periprosthetic fracture classified as Vancouver B2 with a loosen stem. The median age of the patients (male: 21; female: 20) at the time of the periprosthetic fracture was 70.5 years. All patients had a traumatic fall and the average time between index and revision surgery was 8 years.

**Results:** In all 41 patients, the revision and fixation of the fracture was performed through the DAA or the extended DAA interval. All patients had a clinical and radiological follow up for at least one year after the revision surgery. 40 patients had a very good stem alignment and none of the patients sustained a meralgia paresthetica. In eight patients the cup was revised in the same procedure to avoid dislocation after the revision surgery and in seven patients a cemented stem was used.

**Conclusion:** Our study shows, that the DAA and the extended DAA interval is a promising, reliable and safe procedure for revision surgery in THA in case of periprosthetic fractures with a loosen stem.

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## P16 Trauma

### P16-369

#### OUTCOMES OF MANAGEMENT OF PERIPROSTHETIC FRACTURES AROUND STABLE HIP OR KNEE IMPLANTS WITH TOTAL FEMORAL PLATING

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**Introduction/objectives:** Periprosthetic fractures around or distal to hip or knee replacements represent a complex injury. Evidence supports open-reduction-internal-fixation however non-union, infection and further fracture remain a concern. We present our outcomes following 'total femoral plating' for these fractures.

**Methods:** A retrospective study of 17 consecutive patients treated between May 2014 and December 2017 with total femoral plating (TFP) for fracture around THR or TKR was performed. TFP was defined as open-reduction-internal-fixation with plates spanning the prosthesis and entire femur. Patients were followed-up clinically, function assessed using the Oxford Hip or Knee score (OH/KS), and quality of life by EQ-5D score. Radiographs were reviewed to establish union and complications were recorded.

**Results:** Twenty-two patients were identified. Three were excluded due to simultaneous revision arthroplasty. Two died of unrelated causes. Of the remaining 17 patients average age was 72.5 years, 88% were female, ASA grade was 3, mean follow-up was 24 months.

Three patients were excluded from outcome scores due to dementia. For the remainder mean OH/KS was 50.25, EQ-5D scores were >4 for all modalities, Visual Analogue Scale (VAS) was 64.4/100.

At follow-up 58% demonstrated radiographic union at 3 months, 76% at 6 months. Four had symptomatic non-union, 3 had revision plating or retrograde nailing. One patient underwent revision arthroplasty to proximal femoral replacement with good clinical outcome. No other operative complications were identified.

**Conclusion:** Total femoral plating provides pain relief and return to function when used to treat periprosthetic fractures around stable implants in this challenging patient group.

## P16 Trauma

### P16-156

#### CERAMIC HEAD FRACTURE AFTER HIGH-ENERGY TRAUMA

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**Case Study:** Even with the implementation of newer ceramics, the risk of component failures is present in a small percentage of patients, it represents a catastrophic event that inevitably requires revision surgery, whose results might be unpredictable in terms of implant survival and complications

**Objectives**

We report two patients, each with a ceramic-on-ceramic total hip replacement for over 14 years and who performed a normal life, both suffered high-energy trauma and we have reviewed the published literature to check if there are risk factors for ceramic component fracture following a total hip replacement

**Methods**

We performed a search using the keywords "ceramic", "alumina", and "total hip replacement/hip prosthesis" in combination with "failure", "fracture", "diagnosis", "component breakage". There were one randomized multicenter trial, two case-control studies, 23 retrospective case-series, 25 case reports and one review.

**Results**

One of our patients has had a car accident and the other one a big fall. A trauma was involved in the generation of fractures in 7 reports. The only factor published on the literature associated to the risk of ceramic head fracture was the use of short neck 28mm heads.

The fracture of the ceramic implant was immediately seen in one patient but in the other one it took months to see it. Both patients needed a revision surgery performing an extensive synovectomy, irrigation of the articular space and implanting a new ceramic-on-ceramic implant.

**Conclusions**

Short neck 28mm heads, cup malposition and misalignment of the liner are relevant factors that increase the risk of implant fractures. Surgeons may advise patients with ceramic-on-ceramic implants to avoid activities which involve heavy impact.

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## P16 Trauma

### P16-188

#### RECURRENT ANTERIOR DISLOCATION OF THE HIP ASSOCIATED WITH IPSILATERAL INTERTROCHANTERIC FRACTURE OF THE FEMUR - A CASE REPORT -

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**Case Study:** Anterior hip dislocation occurs rarely, about 8-15% of all hip dislocations. Anterior dislocation of the hip and ipsilateral intertrochanteric fracture of the femur are very rare and only a few cases have been reported in the literature. In addition, recurrent hip dislocation is rare in 0.3-1.2% of all hip dislocations. Most of these cases are posterior dislocations. Recurrence of anterior dislocation is extremely rare. We report a case of recurrent anterior hip dislocation in a 60-year-old female patient who had an anterior dislocation of the hip with ipsilateral intertrochanteric fracture of the femur treated by closed reduction and intramedullary nail fixation, respectively.

## P16 Trauma

### P16-191

#### COMPARATIVE STUDY OF COMPRESSION HIP SCREW AND PROXIMAL FEMORAL NAIL IN AO/OTA 31-A2.2 INTERTROCHANTERIC FRACTURE OF THE FEMUR

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**Introduction/objectives:** This study compared the clinical results between compression hip screw(CHS) and proximal femoral nail(PFN) after the treatment of AO/OTA 31-A2.2 intertrochanteric(ITC) fractures.

**Methods:** We retrospectively reviewed 125 cases of AO/OTA A2.2 ITC fracture, treated with either CHS (group I, 34 cases) or PFN (group II, 91 cases). We evaluated the mean operation time, estimated blood loss and transfusion, hospital stay, sliding length of lag screw, tip-apex distance, change of neck shaft angle, mean union time, weight bearing time, mechanical failure, and ambulatory ability by the Parker and Palmer mobility scores.

**Results:** Operative time, estimated blood loss, transfusion, hospital stay, tip-apex distance, change of neck shaft angle, and Parker and Palmer mobility scores were not significantly different between the two groups(p>0.05). However, the mean sliding length of lag screw was 8.15mm and 3.94mm for group I and II, respectively. The mean union time was 16.9 weeks and 15.6 weeks, respectively. And the mean full weight bearing time was 4.5 weeks and 2.3 weeks, respectively. The mean sliding length of lag screw, union time, and full weight bearing time all had statistical significance(p<0.05). There were a total 3 cases of postoperative complications in group I and 4 cases in group II.

**Conclusion:** We conclude that proximal femoral nailing is more reliable than compression hip screw fixation as a treatment method for AO/OTA A2.2 intertrochanteric fracture.

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## P16 Trauma

### P16-324

#### MANAGEMENT OF PERIPROSTHETIC FEMORAL FRACTURES

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**Introduction/objectives:** Periprosthetic fractures are one of the most challenging complications after hip replacement. The aim of this retrospective study was to evaluate the clinical outcome of surgical treatment of periprosthetic femoral fractures following total hip arthroplasty using treatment algorithm of the Vancouver classification.

**Methods:** Forty seven periprosthetic femoral fractures operated-on during the period 2004-2016 were followed-up retrospectively. There were 35 women and 12 men with mean age at the time of surgery 65.4 years (52-88 years). The mean follow-up for the group was 4.5 years (range, 1-13 years). Periprosthetic fractures were classified according to the Vancouver classification. The clinical evaluation was performed with the Harris hip score, the Western Ontario and McMaster University Osteoarthritis Index (WOMAC) and Short Form 8 (SF-8). Bone healing, implant survival, pain, function and complications were recorded. Bone healing and implant stability were evaluated clinically and on plain radiographs.

**Results:** Uneventful bone healing was achieved in 42 cases. In two fractures (one type B1, one type C) nonunion and plate failure occurred. Two cemented stems were revised for aseptic loosening 6.5 and 7 years after fracture fixation. Uncontrollable prosthesis infection and sepsis in a rheumatoid (immunocompromised) patient required disarticulation of the involved extremity.

**Conclusion:** Periprosthetic femoral fractures are difficult to treat and require complex treatment approach according to risk assessment, fracture type, implant stability, bone stock and patient status. Using a treatment protocol of the Vancouver classification we obtained satisfactory outcome.

## P16 Trauma

### P16-587

#### ACETABULAR FRACTURE FIXATION VIA A MODIFIED STOPPA INTRAPELVIC APPROACH.

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**Introduction/objectives:** Acetabular fractures are among the most difficult fractures to manage in orthopaedic surgery. Anatomic reduction and stable fixation is necessary to achieve optimal result and is highly dependent on the ability of surgeon to get good exposure. The modified Stoppa approach, first described by Hirvensalo and later by Cole and Bolhofner, is a new intrapelvic approach to access acetabular fractures, providing access to the medial wall of the acetabulum, quadrilateral surface and sacroiliac joint. When compared to extensile exposures has lesser complication rates, lower morbidity and shortening of surgical time.

**Methods:** The authors present a case series of 7patients with acetabular fractures, treated by open reduction and internal fixation by modified Stoppa approach, between Jan2017 and Dec2017. The patients were evaluated preoperatively with plain radiographs and CT scan and were assessed with a modified Harris Hip Score and Visual Analogue Scale postoperatively.

**Results:** All patients were men, aged between 20and 63years. No intraoperatively complications were found. One patient died from organic complications and another had deep venous thrombosis, without sequelae. Early mobilization was initiated on 1st day and weight bearing at 4weeks. Overall a reasonable anatomical reduction was achieved, with satisfactory clinical outcomes and return to daily life activities.

**Conclusion:** The modified Stoppa approach is a less invasive approach, providing clear acetabular access for anatomical reduction and fixation and minimizing surgical complications, with better visibility approach of all anterior elements make it a good alternative to the classic ilioinguinal. Although we have obtained good functional results, there is a steep learning curve to take in account.

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## P16 Trauma

### P16-66

#### PAUWELS' ANGLE AS A PROGNOSTIC FACTOR IN THE OSTEOSYNTHESIS OF GARDEN I AND II SUBCAPITAL FEMUR FRACTURES

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**Introduction/objectives:** The Gold-standard for Garden I & II subcapital fractures treatment is osteosynthesis with 2 or 3 cannulated screws. Subcapital femoral fractures are known to cause many complications such as Non-union or Avascular Necrosis (AVN) of the femoral head. An increased Pauwels angle has been described in the literature as a prognostic fracture, with an increased angle correlating with a larger complication rate.  
**Objectives:** To evaluate the Pauwels Angle as a prognostic fracture in the treatment of Garden I & II subcapital femoral fracture.

**Methods:** A sample of 42 patients underwent internal fixation with cannulated screws in a period of ten years with a minimum follow-up of 8 months, was retrospectively analyzed. These patients were divided in three groups according to the Pauwels Classification. We tested the correlations between an increased angle and the rate of complications.

**Results:** There were two cases of AVN (4,7%), three cases of Fixation Failure (7,1%) and one Non-union (2,3%) with a total complication rate of 14%. We couldn't find a significant correlation between the Garden Classification ( $p=0,449$ ) or the Pauwels angle ( $p=0,067$ ) and the complication rate. Age, time until surgery and pre-existing hip arthrosis, also did not correlate with an increased rate of complications.

**Conclusion:** The use of cannulated screws for internal fixation remains the Gold-standard for the treatment of these patients. Contrary to the literature, we couldn't correlate the classic prognostic factors with the negative outcome associated with the osteosynthesis of the proximal femur.

## P16 Trauma

### P16-67

#### METASTASES OF THE FEMUR. AETIOLOGY, DIAGNOSIS AND TREATMENT - A REVIEW OF OUR EXPERIENCE

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**Introduction/objectives:** The skeleton is the most common location of metastatic lesions. The diagnosis of pathologic fractures should be routinely considered in patients with long limb-bone fractures, especially in the femur.  
**Objectives:** Characterize the etiology, treatment and survival rate of patients with metastatic femoral lesions treated in our institution.

**Methods:** A sample of patients diagnosed with metastatic femoral lesion in our institution in a time period of 9 years was retrospectively analyzed. We reviewed the data for age, gender, etiology, primary manifestation, primary lesion, type of surgery, lesion location and survival rate of these patients.

**Results:** Between 2007 and 2016, a total of 17 patients were diagnosed in our institution with a mean age of 72 years. Fracture was the primary manifestation in 94% of patients. Most were subtrochanteric (41,2%), followed by intertrochanteric fractures (23,5%). Breast Cancer was the most prevalent primary site representing 35% of cases; Colon & Rectal Cancer was the primary lesion in 17,6%, and Lung in 11,8%. All the lesions were lytic. Three patients underwent hip arthroplasty, eleven were submitted to osteosynthesis with endomedular nail, two patients were not operated for medical reasons and one patient was submitted to a Girdlestone arthroplasty resection. We observed a mortality rate at 1 and 5 years of 41% and 70% respectively.

**Conclusion:** Female dominance in our sample is in accordance to the literature has well as the higher incidence in the seventh and eight decades of life. Unlike previous studies, prostate, renal and thyroid cancer did not have a major contribution in our sample. Has expected, the survival rate of the patients was low with a high percentage of fatalities at the one year mark.

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## P16 Trauma

### P16-443

#### TREATMENT OF PERIPROSTHETIC FEMURAL FRACTURES WITH UNCEMENTED MODULAR REVISION STEM WITH DIAPHYSEAL HOLD: OUR EXPERIENCE

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**Introduction/objectives:** Objective of this study is to evaluate mid-term results of a consecutive population of patients undergoing revision hip surgery due to a femoral periprosthetic fracture using a non cemented modular femoral stem with diaphyseal grip.

**Methods:** 40 patients affected by periprosthetic femoral fractures, 30 females and 10 males, mean age 71 years (range 49-87). 30 fractures classified as Vancouver B2 and 10 as B3. In 67% of cases pre-operative CT scan was performed. Mean follow up is currently 40 months (range 8-70 months). In 36 patients we did a femoral stem revision using an uncemented modular revision stem plus cerclages, in 2 cases we revised the stem reinforcing with a plate with screws and cerclages, in 2 other cases we revised just the stem. One single case of total hip revision including acetabular component for aseptic loosening.

**Results:** At the last clinical follow up every fracture was healed with no signs of mobilization of the implants. 73% of the patients had non pain while 27% of them suffered a light pain (VAS range 1-3). Half of the population walks without any support, 39% of them is still using a crutch for long walk, 11% is used to walk with supports. Harris Hip Score mean value was 84 points. We observed one case of superficial infection and one implant dislocation which required revision surgery.

**Conclusion:** Modular femoral stem with diaphyseal grip, by passing the fracture zone, allows early mobilization of the patient and through the modularity of the implant it allows an optimal match with the socket, obtaining correct anti version and offset, no limb length discrepancy, with bone ingrowth in proximal portion of the femur. Titanium elastic model lows thigh pain and stress shielding.

## P16 Trauma

### P16-31

#### B2 PERIPROSTHETIC FEMORAL FRACTURES AROUND PREVIOUSLY WELL-CEMENTED POLISHED STEMS CAN BE TREATED WITH OSTEOSYNTHESIS IN LOW-DEMAND PATIENTS

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**Introduction/objectives:** Although revision surgery remains as the gold standard for treatment of Vancouver B2 periprosthetic femoral fractures, minimally-invasive reduction and fixation (MIRF) may be considered in low-demand, elderly patients. Thus, we aimed to describe the outcome of a series of octogenarians with displaced B2 femoral fractures around a priority well-cemented stem treated with osteosynthesis.

**Methods:** Between 2014-2016, 35 type B2 periprosthetic fractures were operated, of which 16 were treated with MIRF using a 4.5mm locking compression plate (LCP). We excluded 2 cases for having a cementless stem and 1 for being a cementless hemiarthroplasty. All cases had a hybrid total hip arthroplasty with a well-cemented polished stem (Barrack A or B) and consisted of low-demand patients, being at least American Society of Anaesthesiologists (ASA) Class III. Mean age at presentation was 89 years old (SD±3.42). Mean follow-up was 35 months (min, 18 months). Rehabilitation protocol consisted of early mobilisation, walking initially with partial weight bearing.

**Results:** All cases healed uneventfully with no signs of subsidence, malalignment or plate breakage. At 20 days postoperatively, one case presented with a deep wound infection that required debridement and irrigation with implant retention. One patient developed a deep vein thrombosis that was medically treated. At latest functional follow-up, all patients were subjectively satisfied, with a mean postoperative Parker mobility score of 6.62 (range, 4-9). Three patients died at a mean of 11.33 months (range, 9-13) due to complications unrelated to index surgery.

**Conclusion:** In low-demand patients, reduction and fixation with LCP is a valid alternative for the treatment of B2 femoral fractures around polished stems.

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