FM103  Dual mobility socket to prevent instability in primary total hip replacements: results at 10 years minimal follow-up

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Introduction: Total hip arthroplasty (THA) instability is well documented to be more common in specific demographic groups. We report a retrospective analysis of the use of a dual mobility implant for primary hip replacements in selected patients at risk for dislocation. The aim of this study was to assess the long-term clinical and radiologic features associated with the dual mobility cup in case of primary THA.

Materials and Methods: At our institution 119 primary THA were performed in 114 patients (74 females and 40 males) at high risk of instability between January 2000 and December 2002. 84% of the patients had at least two risk factors for dislocation. The mean age was 71 years old (range, 21.4 to 93.2 years) at the time of the arthroplasty. A dual mobility socket was used in all cases. Clinical result was assessed using Harris Hip Score, and complications were determined by detailed review of the patient’s records. Radiographs of the involved joint were reviewed to assess the position of the prosthesis and to look for osteolysis and signs of loosening of the implant.

Results: During the study period, 56 patients (47%) died of unrelated causes. 17 patients (15%) were lost to follow-up. For the remaining 41 patients (46 hips, 38%), the minimal follow-up was 10 years (119 to 154 months, mean 133 months). Harris hip score improved from 39.6 to 82.4 (p<0.05). Only one late dislocation was observed, 7 years after the surgery, in a 35-year old female with Mannosidosis.

Two hips were revised at latest follow-up, for deep infections. No aseptic loosening of the cup or osteolysis was observed at latest follow-up.

Conclusion: The dual mobility system was extremely successful in achieving stability in this continuous series of patients with increased risk for dislocation. In addition, no mechanical failure, and no osteolysis or aseptic loosening of the cup has been reported. The use of dual mobility cup to prevent instability in selected patients is a reliable option at long term follow-up.
Revision of unstable THA using a dual mobility socket: 3.5 to 11.1 year follow up

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Introduction: Revision procedures for unstable total hip arthroplasty have been reported with high failure rates. Many options have been proposed in such challenging cases, including dual mobility. The purpose of this retrospective study was to assess the clinical and radiologic features associated with the dual mobility cup in case of revisions for instability.

Materials and Methods: Sixty four total hip arthroplasties (62 patients) were revised for THA instability using a dual mobility cup at our institution between March 2000 and April 2008.

Mean age at reoperation was 67.3 year old (range, 35 to 98). The outcome of the revision procedure was assessed using the Harris Hip Score, and complications were determined by detailed review of the patient’s records. Anteroposterior and lateral radiographs of the involved joint were reviewed to assess the position of the prosthesis and to look for osteolysis and signs of loosening of the implant.

Results: Mean follow-up was 7.5 years (range, 3.5 to 11.1). At last review 11 patients had died and one was lost to follow up. Postoperatively there was a significant improvement of the Harris Hip Score. Sixty-three patients (98.4%) had no further episodes of dislocation. There were 3 revisions for deep infection, and 4 for mechanical failures including 2 dissociation of the bipolar component, one head-trunion dissociation, and one aseptic loosening of the acetabular construct. For the remaining patients, no radiolucent lines around the components and no osteolysis were observed at latest follow up.

Conclusion: The dual mobility cup is a highly effective option to manage unstable total hip arthroplasty. Unlike constrained devices, such implants provide encouraging radiologic results regarding the potential for loosening and osteolysis at mid- to long-term.
Constrained implants for total hip arthroplasty instability: analysis of failures

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Introduction: Recurrent instability after total hip arthroplasty remains a serious and somewhat frequent problem. Constrained implants have proven effective to manage instability. This has led to a liberal utilization of these devices. However, sporadic mechanical failures have been reported. This report analyzes the failures of a single constrained device at our institution.

Materials and Methods: Forty-three constrained implants (Stryker Constrained Liner™) in 34 patients were revised out of total 390 similar implants performed at our institution. There were 24 females and 10 males. Constrained implant was inserted at the first revision in 6 hips and after an average of three surgeries (1-6) in 37 hips. Seven different methods of constrained liner fixation were observed. Eight different theoretical failure mechanisms were identified: six are mechanical device failures at each of the implant interfaces, infection and catastrophic polyethylene wear being the other two.

Results: Average time to failure was 28.4 months (1-78). Several failure mechanisms were operating in most cases. The predominant mechanism was infection in 12 (28%), type I (failure of fixation to bone) in 11 (26%), type II (failure of mechanism holding the liner to shell) in 6 (14%), type III (failure of the bipolar holding mechanism) in one (2%), type IV (dislocation of bipolar) in 9 (21%), type V (dislocation of femoral prosthetic head from bipolar) in 3 (7%), and in 1 hip we could not identify the failure mechanism; There were no instances found of type VI failure (disengagement of the prosthetic head from trunion) or catastrophic polyethylene wear.

Conclusion: Constrained tripolar implants are complex devices with multiple interfaces. We have shown multiple mechanisms of failure of these devices, and we therefore advocate restricting their use to salvage situations. As an alternative to constraining systems, dual mobility sockets have also proven effective on stability, with decreased risk for mechanical failure because of a simple design involving a limited number of parts. For these reasons, the current use of constrained implants has decreased, and the dual mobility sockets are becoming the most popular options.
FM106  Physical activity before and after primary total hip arthroplasty: a registry-based study

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Objective: Recovery of physical function is an important goal of total hip arthroplasty (THA). Detailed assessment of activity before and after THA including a long-term follow-up is lacking. Our objective was (1) to evaluate how patient’s activity evolves: prior to disease onset, prior to THA, and at 5 and 10 years postoperative, and (2) to determine predictors of high activity 5 years postoperative.

Methods: We included elective primary THAs operated upon in a large University hospital between 1996 and 2012. A cross-sectional analysis compared mean UCLA activity scores over four periods: prior to onset of symptoms of osteoarthritis, prior to surgery, 5- and 10-years postoperative. Stratified analyses were performed by sex, age, BMI, ASA classes and perceived preoperative activity level. A prospective analysis was conducted to identify baseline characteristics associated with a high level of physical activity 5 years postoperative.

Results: The mean UCLA scores prior to symptom onset (N=189), prior to THA (N=203) and 5 (N=1085) and 10 (N=757) years postoperative were 6.9, 3.5, 5.7 and 5.5, respectively. UCLA scores \(\geq 7\) were reported by 49\% prior to symptom onset, 5\% prior to surgery, and 28\% at five and ten years postoperative. Younger age, male gender, lower BMI and ASA score, and an active lifestyle prior to surgery were predictive of high physical activity 5 years after surgery.

Conclusion: Primary THA substantially and durably improved physical activity in men and women and in all age categories, but postoperative activity levels remained lower than just before the onset of OA symptoms.
FM107 Effect of cup-medialization on flexion and abduction moment arms in total hip arthroplasty

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Introduction: The classic technique of total hip replacement described by Charnley and Müller includes a medialization of the acetabular cup towards the ilioischial line with a compensatory increase of the femoral offset in order to keep the global offset anatomical. This concept is based on a 2D analysis of moment arms, which lead to the conclusion that the more medial the center of rotation is, the more favorable the moment arms. However, medialization is associated with significant bone loss. In addition, the working length of muscle fibers is altered.

The purpose of this study was to compare moment arms of the hip abductors after an anatomical reconstruction with those of a reconstruction with cup medialization in a numerical 3D model of the hip during the gait cycle.

Methods: A 3D numerical model of a patient with “normal” hip anatomy was developed (using FE software Abaqus, Dassault Systèmes). The model is based on a CT scan, including the gluteus medius, minimus and maximus. A total hip prosthesis was virtually implanted with and without cup medialization (5mm), keeping the global offset constant in both cases. Bone and prosthesis were assumed rigid, while a hyperelastic deformation law was used for the muscles. Passive flexion-extension and abduction-adduction were simulated. The range of motion corresponded to gait cycle. The gluteus medius (middle fiber) moment arm was calculated for these 2 (planar) movements separately.

Results: During flexion-extension, the minimum, average and maximum moment arms of the gluteus medius were 9.0, 10.6 and 11.2 mm without cup medialization, and 10.4, 11.7 and 12.2 mm with medialization. Respective values for abduction-adduction were 38.2, 40.5 and 41.8 mm without and 40.2, 43.1, 44.7 mm with medialization. A cup medialization of 5 mm leads to an increase of the gluteus medius moment arm of (minimal, average and maximal values) 15, 10 and 9% for flexion-extension and 5, 6 and 7% for abduction – adduction, respectively.

The change in length of the middle muscle fiber, with or without offset, was less than 1 mm.

Conclusion: A cup medialization of 5 mm resulted in an increase of 5-15% of the lever arm of the gluteus medius throughout the gait cycle, while a minimal effect on the fiber length was observed.
Micromotion, subsidence and gap at the stem-femur interface after THA: a cadaveric study

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Introduction: Excessive interfacial micromotions around the femoral stem affect the primary stability of hip implants, and may promote aseptic loosening. Physical activities such as stair climbing induce high torsional loads that are thought to endanger more the implant primary stability than compressive loads.

The aim of this study was to extend a technique based on micro computed tomography (µCT) to measure simultaneously and at multiple sites the relative interfacial micromotions and gap during compression and torsion on a cadaveric femur.

Methods: Tantalum markers were stuck on the stem (SPS, Symbios, Yverdon) while stainless steel beads were press-fitted on the endosteal bone surface of a human cadaveric femur. The cementless stem was implanted according to the technique recommended by the manufacturer. After implantation, compressive (2000 N) and torsional (13 Nm) loads were successively applied with a custom-made loading device. µCT scans were performed at 3 steps: before, during and after loading.

A custom-made image-processing algorithm was used to detect bone and stem markers from µCT images. The third unloaded µCT was used as a reference and the first two µCT were rigidly transformed so as to have the stem beads overlapping. The 3D micromotions were the difference of bone markers position between the loaded and reference µCT, while subsidence was derived from the first and last µCT. Gap was the closest distance between the bone markers and stem surface in the reference µCT.

Results: Micromotions, subsidence and gap were simultaneously measured for 384 steel beads, spread within a 40-mm region of interest. Maximum micromotions were 95 µm in compression and 170 µm in torsion. Mean subsidence was 2190 µm in compression and 630 µm in torsion. For both load cases, gap was small against the bearing faces of the implant.

Conclusion: During compression, maximal micromotions measured were below the critical value of 150 µm reported to induce aseptic loosening of the prosthesis. During torsion, local micromotions exceeded this threshold. This result underlines the importance of a simultaneous and multisite measurement of micromotions, for different load cases.

To conclude, we developed a technique to get a quasi-continuous distribution of interfacial micromotions, subsidence and gap around the femoral stem during compression and torsion. This method could be used to test implant design, surgical techniques, or validate numerical models.
One-stage bilateral total hip replacement using the direct anterior approach is safe and effective

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**Background:** The direct anterior approach without using a fracture table is suitable for patients who require bilateral total hip replacement (THR) and this can be performed during a single operative session. The potential benefits of single stage THR include a single episode of anesthesia, more efficient use of resources, reduced overall hospitalization and shorter rehabilitation periods. Some studies have, however, reported a higher incidence of medical and surgical complications after single stage bilateral THA compared to a staged procedure.

**Purpose:** The aim of this study is to determine whether single stage bilateral THA using the direct anterior approach is as safe and effective as the unilateral procedure regarding complications, radiographic assessment, and patient-reported clinical outcomes.

**Patients and Methods:** We retrospectively compared 14 patients who had single stage bilateral THA with a matched group of 28 patients who underwent unilateral THA with a minimum 2 years follow-up for both groups. Duration of anesthesia, operative time, blood loss, length of hospital stay, and any intraoperative or postoperative complications were recorded. Cup inclination and heterotopic ossification were analyzed on postoperative radiographs. Generic (EQ-VAS and EuroQoL-5D index) and condition-specific (Oxford Hip Score) instruments were used to assess patient-reported outcomes.

**Results:** No significant differences between the two groups were found for complications, radiographic assessment, or patient-reported outcomes. In the single stage THA group, blood loss, anesthesia, and operative times were less than double that of the unilateral group.

**Conclusions:** Single stage bilateral THA using the direct anterior approach seems to be as safe and effective as a unilateral THA, with favorable short-term clinical and radiological outcomes and similar complication rates.
Diagnosis and management of failed metal-on-metal total hip arthroplasty

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Introduction: Large head metal-on-metal (MoM) total hip arthroplasty (THA) has been considered as particularly interesting in young and active patients. This type of total hip replacement has several advantages, such as less wear, lower risk of dislocation and better range of motion. Unfortunately, revision rate is significantly higher.

The purpose of this study is to review our revision cases and to define clinical, biological and radiological criteria helping us to decide if revision surgery of a large head MoM THA is necessary (flow chart). Technical and surgical aspects are discussed.

Materials and methods: Between 2005 and 2012 we implanted 352 large head MoM THA. We reviewed all patients with large head MoM THA operated in our department during this period. 17 (5%) patients with a mean age of 67 years (+/- 9) have been revised. Patients complaints were noted. They all had blood test analysis (FBC, PCR, chrome/cobalt serum concentration) and standard x-ray. Sometimes CT and hip aspiration were necessary to obtain a better assessment. Anatomopathological and microbiological analysis were obtained systematically.

Results: With a mean follow-up of 5 years (+/- 2) after THA, 13 patients presented pain associated with a decreased range of motion, 2 patients a periprosthetic fracture, 1 patient with a swelling around the thigh and 1 infection. In all cases, chrome/cobalt serum level was elevated (maximum Chrome/Cobalt: 2203/2344 nm/l). No superficial signs of inflammation were reported but blood test sometimes showed increased inflammatory parameters, which needed complementary investigation by hip aspiration. On the x-ray analysis, implants were in an adequate position except in 2 cases, where the cup was too vertical (>45° of inclination). Osteolysis was rarely obvious on standard X-ray, but was uncovered by CT scan, particularly on the acetabular side. In 14 cases, revision included cup and femoral head exchange and in 3 cases cup and stem were revised. Aggressive synovitis with local invasion of muscles (gluteus medius and psoas) and metallosis were observed and confirmed by anatomopathological analysis.

Conclusion: Large head MoM THA represents a serious concern because of a high rate of revision. Pain and decreased range of motion with a high blood level of chrome/cobalt were routinely found. Revision of MoM THA involved most of the time an exchange of the cup and the femoral head. Surgery could be complicated by severe cancellous bone resorption on the acetabular side and/or lysis of tendon attachment.

Patients with large head MoM THA should be closely followed-up. In case of clinical complains, elevated Chrome/Cobalt serum concentration or radiological (standard X-rays, CT) abnormalities, early revision should be proposed.
Assessment of Congruence and Impingement of Prosthetic Hips during Everyday Tasks

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Introduction: Conventional pre-operative planning for total hip arthroplasty mostly relies on the patient anatomy for the positioning and choice of implants. This kind of planning essentially remains a static approach since dynamic aspects such as the joint kinematics are not taken into account, and is hence not able to fully consider the evolving behavior of the prosthetic joint that may lead to implant failures. In fact, kinematics plays an important role since some movement can create conflicts within the articulation and yielding possible dislocations. The goal of our study was to assess the relationship between acetabular implant positioning variations and resultant impingements and loss of joint congruence during daily activities.

Methods: 3D models of prosthetic hip joints (pelvis, proximal femur, cup, stem, head) were developed based on variations of acetabular cup's inclination (40°, 45°, 60°) and anteversion (0°, 15°, 30°) parameters, resulting in a total of 9 different implant configurations. Femoral anteversion remained fixed and determined as "neutral" with the stem being parallel to the posterior cortex of the femoral neck. Motion capture data of daily tasks were applied to all implant configurations. The motions were obtained from 4 healthy volunteers (mean age, 28 years) during routine (stand-to-sit, lie down) and specific activities (lace the shoes while seated, pick an object on the floor while seated or standing) known to be prone to implant dislocation and impingement.

While visualizing the prosthetic models in motion, a collision detection algorithm was used to locate abnormal contacts between both bony and prosthetic components. Moreover, femoral head translations (subluxation) were computed to evaluate the joint congruence.

Results: The simulations showed that collisions occurred at maximal ranges of motion in the anterosuperior part of the acetabulum. The more the inclination and anteversion were important, the lower the frequency of impingements was noted (e.g. 23% at 40°/0°, 13% at 45°/15°, 5% at 60°/30°). Subluxations followed the same trend (e.g. 4.0 mm at 40°/0°, 1.5 mm at 45°/15°, 0.2 mm at 60°/30°) and were observed as a consequence of impingements.

Conclusion: Daily tasks could expose the prosthetic hip to subluxation and impingement located in anterosuperior position. This location could be explained by the high hip flexion required to execute the motions (≥ 95°). Considering the kinematics solely, increasing inclination and anteversion seems to decrease possible conflicts, but mechanical aspects (stress, wear) should also be considered in the definition of ideal cup positioning.
Objectives: Between 1992 and 2003 we used the same uncemented Zweymüller titanium hip implant 690-times with the articulation ceramic-polyethylene (UHWMP) and in 663 hips the metal-on-metal articulation Metasul with a forged high carbon alloy. In both articulations the same head diameter 28mm.

In 2003 we reported in cooperation with H.G Willert new findings of a metal-sensitivity reaction type ALVAL, detected in 5 Metasul-hips (0.8%) at the 5 yrs. follow up. (Aseptic Lymphocytic Vasculitis Associated Lesions).

Methods: Therefore continuous clinical and radiological follow-up examinations of all articulations 10 and 15 years after the primary implantation with a special regard to radiological wear associated alterations, such as radiolucent lines, osteolysis and MoM-signs of a hypersensitivity like ALVAL. Till now 202 hips had a 15yrs-follow up with a clinical and radiological examination.

Results: at 14/15 years follow up: 36 hips, 2.6% lost to follow-up.

Ceramic-PE: All revisions 20 (2.9%), two of them wear related.

MoM-Metasul: All revisions 28 (4.2%); wear related 12 (1.8%), aseptic loosening 5 (0.8%), late infections 5 (0.8%), others 7 (1.1%). Ten of all wear related revision (N12) were probably MoM-induced (1.5%) with seven (1.1%) histological confirmed perivascular lympho-plasmacellular infiltrations like ALVAL. Two cases needed a full stem and cup exchange, all other revisions “only” an inlay exchange to PE or HX-PE with later good functional results and new re-ossifications of the MoM-induced osteolyses.

Conclusions: In contrary to the in the first years detected MoM-cases, at the 14/15 years follow-up only a slight increase of the metal-induced revisions from 0.8% to 1.5%. No worrying progression, but compared to the low revision rate of Ceramic-PE no better Metasul-wear behaviour. In contrary to recently reported bad to worse results of large MoM-bearings no unacceptable high failures rate as ARMD or Pseudotumors. (Adverse reaction to metal debris). As a result of the regular performed 5, 10 and 15 yrs. follow-up all revisions were detected early and carried out in time. Only 1 extended osteolysis.
Ten-year comparative effectiveness of metal-on-metal vs. ceramic-on-polyethylene THAs with a small diameter head

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Introduction: Large metal-on-metal (MoM) total hip arthroplasties (THA) have given rise to serious concerns. Studies comparing smaller head MoM to ceramic-on-polyethylene (CoP) THAs over a longer follow-up period are lacking.

Objectives: Our objective was to evaluate complications, radiographic and clinical outcomes in MoM vs. conventional CoP THAs during the first 10 years postoperative.

Methods: Prospective cohort study including all MoM (group 1) and CoP (group 2) THAs with an uncemented press-fit cup and 28mm head. The following outcomes were compared: (1) Complication rates (infection, dislocation, revision) and all-cause mortality for patients operated upon between 3/1996 and 6/2011 (mean F/U 109 months, range 12-195); (2) Incidence of osteolysis; and (3) Clinical outcomes at 5 and 10 years postoperative. Evaluation was performed by an independent assessor. Cox regression was used to compare incidence rates of complications and mortality and multivariable linear regression to compare clinical scores.

Results: 3,341 THAs were included, 883 with MoM and 2,458 with CoP bearing. Crude incidence rates for complications were: 1.4 vs. 0.9 cases/1000 person-years (p-y) for infection; 3.6 vs. 3.2/1000 p-y for dislocation; and 4.3 vs. 2.4 /1000 p-y for all-cause revision. Adjustment for baseline differences substantially attenuated the higher rates for infection (adjusted hazard ratio (HR) 1.3, 95% CI 0.5; 3.0) and revision (adjusted HR 1.2, 95% CI 0.7; 2.2). Mortality was similar in both groups (adjusted HR 1.0, 95% CI 0.7; 1.3). Only in the MoM group 6 (0.7%) patients developed adverse local tissue reaction and required revision at a mean F/U of 73 months (range 17-139). No substantial difference in osteolysis at 5 and 10 years was observed between the two groups.

At 5 years, 449 MoM and 1,444 CoP THAs were seen; at 10 years, 75 MoM and 653 CoP THAs. Clinical outcomes were similar both at 5 and 10 year F/U after adjusting for baseline differences.

Conclusion: Mid-term results did not substantially differ with respect to complications, radiographic and clinical outcomes between MoM and conventional CoP THAs, suggesting no major advantage for use of a small head MoM bearing in the first 10 years postoperative. However, the potential disadvantage of metal wear debris remains a concern even with smaller head sizes as evidenced by an adverse local tissue reaction in 6 patients in the MoM group.
Recovery of hip muscle strength after hip arthroscopy in patients with symptomatic femoroacetabular impingement

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Introduction: Patients with symptomatic femoroacetabular impingement (FAI) present with hip muscle weakness. The restoration of hip muscle strength after hip arthroscopy to address FAI is therefore a major concern in this cohort of young and active patients. Aim of this study was to prospectively evaluate hip muscle strength of patients with symptomatic FAI 2.5 years after hip arthroscopy.

Methods: Hip muscle strength of 8 patients with symptomatic FAI (age: 29 ± 10 years) was evaluated preoperatively and 2.5 years after hip arthroscopy, and was compared to 8 healthy matched controls. Maximal voluntary contraction (MVC) strength was measured for all hip muscle groups (adductors, abductors, internal rotators, external rotators, flexors, extensors) using hand-held and isokinetic dynamometry. At follow-up, we also used (1) the Hip Outcome Score (HOS) to evaluate hip pain and function during activities of daily living (ADL) and sport activities (sport), (2) the symptom-specific well-being outcome to assess the acceptability of the current health state related to the hip, and (3) the global treatment outcome to evaluate hip arthroscopy.

Results: Patients showed significant increases in MVC strength for all hip muscles (9 to 59%, p< 0.05). At follow-up, only hip flexor MVC strength was lower for patients than controls (-18%, p= 0.03), and patients had HOS scores of 92 ± 7 and 82 ± 18 for ADL and sport, respectively. One patient (out of 8) was “very satisfied” with the health state of the operated hip, 3 patients were “somewhat satisfied” and 4 patients were “neither satisfied nor dissatisfied”. Four patients (out of 8) reported that hip arthroscopy “helped a lot”, 3 patients that it “helped”, and one patient that it “helped only little”.

Conclusion: Patients with symptomatic FAI recovered their hip muscle strength to normal levels 2.5 years after hip arthroscopy, except for hip flexors. Although hip muscle strength was restored, clinical outcomes were good-to-excellent, and general positive evaluation of surgery at follow-up, half of the patients were not completely satisfied with their postoperative health state related to the hip.
Enlargement of the anterior approach to the hip joint: Potential risk to neurovascular structures.

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Introduction: Many studies favour the anterior approach (AA) for total hip arthroplasty. However, some report high complication rates, especially when using the mini-incision technique. In cases of intraoperative complications, the surgeon may need to enlarge the approach distally by splitting the interval between the rectus femoris (R) and vastus lateralis (VL). This extension endangers neurovascular structures, namely the branches of the femoral nerve (F) and of the lateral femoral circumflex artery (LCA). The purpose of this study was 1) to demonstrate the proximity of neurovascular structures with regards to AA at the hip joint and 2) to investigate if the AA could be safely enlarged distally.

Methods: Seventeen cadaveric hemipelves with legs from twelve specimens were dissected. All nerve branches to the VL, vastus intermedius (VI), Sartorius (S) and R as well as vessels arising from the LCA were traced. The entrance of each nerve branch into its specific muscle belly was recorded and the distances to two reference lines were measured: 1) the horizontal line through the middle of the neck of the femur proximal to the intertrochanteric line (X1) and 2) the horizontal line through the lower margin of the lesser trochanter (X2). A Cerglage hook was inserted between X1 and X2 and damage to neurovascular structures was recorded.

Results: The VL was innervated proximally and distally, the VI medially and laterally by branches of F. The proximal part of VL, lateral part of VI, the S and R received branches mainly from between X1 and X2; In contrast, the S and R received nerve branches more anteriorly and superficially, a safe distance from the enlarged AA. The LCA always divided into its branches between X1 and X2. The distal part of the VL and medial part of the VI were innervated distal to X2. The insertion of the Cercage hook regularly led to damage or tearing of muscle branches to the VL, VI and branches of LCA while branches to the S and R remained untouched.

Conclusions: The distal enlargement of the AA to the hip joint results in direct denervation of proximal lateral parts of the quadriceps muscle. Additionally, damage to branches of the LCA is very likely. The enlargement of the AA distal to the intertrochanteric line as well as the placement of instruments over the AA should be avoided.
Evaluation of Bernese periacetabular osteotomy: Short Term Results of a consecutive series of 194 patients

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Introduction: Periacetabular osteotomy (PAO) aims to influence the natural history of malformed hip joints (acetabular dysplasia and retroversion) by improving femoral head containment. Whereas long term outcome in terms of OA has been documented over 20 years, the present study focuses on its peri- and postoperative morbidity and patient’s short term benefit.

Material: Prospectively documented consecutive series of 194 PAOs performed by 3 surgeons. Demographics, hospital stay, blood transfusions, intraoperative and postoperative complications and time to recover as well as subjective outcome measure in terms of preoperative and one year WOMAC scores were recorded. Quality of correction was assessed on one year postoperative x-rays. Risk factors for adverse events (blood transfusions, inadequate corrections, non-unions etc) were analysed using univariate analysis.

Results: Indications were dysplastic hips in 170 and acetabular retroversion in 24. Mean age was 26 years (10 to 48). Mean hospital stay was 9 days (range; 4-21 days). Recovery time in terms of use of gait assistive devices was 13 weeks (range, 8-24 weeks). In 16 cases an allogenic blood transfusion was necessary with a mean number of blood units of 2.75 (range 1-7). Relevant nerve damage could be observed in five cases; irritations of the N. cutaneus femoralis lateralis in 19 patients. Elevated blood loos and nerve irritations were more common in reoperations. Intraarticular OT as well as interruption of the posterior pelvic column were seen twice in each case. Loss of correction occurred in three and fatiguing fractures of the lower pubic arm in 12 cases. Four cases presented symptomatic non-unions and needed surgical revision. All of them affected the ischium. Asymptomatic non-unions could be detected in 29 cases. In terms of WOMAC the mean count decreased from 19.3 preoperatively to 13 points one year postoperatively. The mean subjective hip value one year postoperatively was 72% (range; 10-100%) with a mean subjective benefit of 75% (range; 0-100%). In 147 cases patients were satisfied with the operation and willing to repeat it. Radiographically, a reduction of the mean acetabular index from 20,5° to 1,5° was achieved, 95% being in-between -10° to 10°. The mean CE- angle increased from 13,8° to 35.0°, 97% lying above 25°.

Conclusion: The PAO is a demanding operation for surgical correction of acetabular dysplasia and retroversion. In this series good radiographic and clinical results could be reached by contrast to moderate blood loos and low rate of complication in cases of initial surgery.
FM117    Outcome after labral reconstruction for treatment of femoroacetabular impingement

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Introduction: Femoroacetabular impingement (FAI) is a well-described etiology for the development of osteoarthritis (OA) in young adults. FAI is associated with pathological deformities of either femoral head (cam-type FAI) or acetabulum (pincer-type) that leads to damage of the acetabular rim including the acetabular labrum (AL) and cartilage. In pincer-FAI often labrum degeneration is present which makes preservation of the remaining labral tissue impossible. In several studies preservation of the AL showed a significant better clinical outcome than resection due to a postulated sealing effect. To restore labral sealing we reconstructed the AL with the Lig. capitis femoris. Clinical and radiological outcome was assessed after surgical hip dislocation and labral reconstruction and compared to a matched group of patient with labral reattachment.

Patients and Methods: Between 2008 and 2010 eleven patients (13 hips) with FAI underwent surgical dislocation of the hip with reconstruction of the AL. 6 men and 5 women with a mean age of 36 years (22 – 51 y) were followed for a mean of 21 months (9 – 45 m). Hip function was assessed with Oxford hip score (OHS) and VAS for satisfaction and pain (0 - 100) before and after surgery. Integrity of the reconstruction was controlled with Arthro-MRI in 11 out of 13 hip. The matched control group of 11 patients had surgery for FAI during the same time period.

Results: The OHS increased from an average of 29 (SD 9.1) to 41.8 (SD 4.8) postoperatively. The mean improvement of OHS was 13.2 (SD 13.9). Eleven out of thirteen hips had an improvement of OHS ≥ 6. Patient satisfaction improved from preoperatively 37.3 (SD 33.3) to 87.1 (SD 14.2) on a VAS scale with a maximum of 100. Additionally patients were asked about rest and load pain, which showed a mean VAS for rest pain 5.4 (SD 6.6) and for load pain 22.1 (SD 22.7) postoperatively. In Arthro-MRI the reconstructed AL shows isointensity and the comparable size as the native AL.

The data of the control group shows similar results with no statistically significant difference between the two groups.

Conclusion: The reconstruction of the AL yields good results in the majority of patients, comparable to hips where the native AL was preserved. The results are superior to those reported in the literature, where the damaged labrum was resected. In absence of other reconstructive options it has to be considered as a safe option and with no adverse effects.
Metal ions intoxication after hip arthroplasty. Case report and literature review.

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Introduction: Metal on metal (MoM) resurfacing hip arthroplasty (RHA) is the alternative to total hip arthroplasty (THA). Metallosis, one of its complications, is related to the immunological response to the metallic debris and metal ions released through mechanical deterioration of metal implants. The elevated concentrations of the metal ions (cobalt, chrome) in human fluids, can be responsible for the systemic intoxication. We present a case of the patient who after the RHA developed the metallosis, high cobalt and chrome concentrations, and symptoms of intoxication.

Methods: A 60-year-old patient underwent the RHA of the left hip. DUROM implants were used: 56 mm cup and 50 mm head. Few months after RHA he complained of fatigue, lost of concentration, peripheral paresthesia, dysgueusie with metallic taste, weight lost and hearing impairment with tinnitus. The implant position was evaluated on the basis of CT scan. The MRI was performed. The laboratory investigation addressed thyroid, renal and hepatic function. The cobalt and chrome ions level in blood and urine was estimated. On the 16th month the hip revision was performed.

Results: Cup anteversion was 31,5° and inclination was 64,5°. MRI reveled the pseudotumor of 50 x 75 mm. Thyroid hormones showed the subclinical hypothyroidism. Cobalt concentrations were 206 μg/l and 1794 μg/l in blood and urine respectively. Chrome level was 65,7 μg/l in blood and 298 μg/l in urine. There were no signs of infection. Revision surgery was followed by clinical improvement, thyroid hormone normalization and decrease of metal ions concentration in blood. The removed implant showed equatorial stripe wear zones.

Conclusion: There are few report cases describing the intoxication with metal ions in patients after the hip prosthesis surgery. The reported symptoms are hearing and sight impairment, neuropathy, cardiopathy, weight lost, taste disturbance, cognitive problems, hypothyroidisme. The excessive metal components wear, resulting in metal ions accumulation, were caused by:

1- massive third body wear mechanism (remained particles of ceramics after revision surgery)
2 - edge loading due to excessive acetabular inclination in MoM cases.

We propose to identify two categories of patients who are at risk of metal ions intoxication after the hip surgery.
Freie Mitteilungen VIII / Communications libres VIII
Hüfte / Hanche (FM 103 – FM 119)

FM119 Pubic rami fractures in the elderly – an underestimated injury.

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Objective: To evaluate patient characteristics and natural history of pubic rami fractures in elderly people with a special focus on the frequency of concomitant posterior pelvic ring lesions and the percentage of secondary operated patients due to conservative treatment failure.

Study Design: Retrospective cohort study. Patients were treated in university hospital which is equivalent with a level I Trauma center.

Patients and Methods: We analysed 132 consecutive patients, >65-year old, presenting with low energy-trauma pubic rami fractures at our emergency department from January 2009 to December 2011.

Results: Mean age of patients was 84 years (range 66-100). Women were affected 6 times more frequently than men. 15 per cent of patients lost their previous independency permanently due to the injury. 98 per cent of previously independent patients (community dwellers) required temporary hospital care for a median duration of 39 days (IQR 28-52). One-year mortality was 20 per cent. A concomitant posterior pelvic ring lesion was identified by CT-Scan in 54 per cent of patients. In 4 per cent of the patients secondary operative fracture stabilisation was performed.

Discussion: Pubic rami fractures are frequently associated with concomitant posterior pelvic ring injuries making these injuries more unstable than generally assumed. Based on this fact and the long duration of acute hospital stay, more aggressive management of these injuries may be considered. The principle aims in this patient population are satisfying pain management, quicker mobilisation, less dependency and return to previous place of residence.