THE INFLUENCE OF POSTERIOR CRUCIATE LIGAMENT TREATMENT IN MEDIAL PIVOT TOTAL KNEE ARTHROPLASTIES

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Medial pivot total knee arthroplasty is designed to permit posterior rolling and sliding of the lateral femo-
ral condyle around a stable medial femoral condyle. The purpose of the current study was to analyze the weight-
bearing kinematics of medial pivot TKA's with three different treatments of the posterior cruciate ligament: PCL resected, PCL partially released and PCL retained, to determine if the PCL status had a significant effect on Tibiofemoral translations or rotations in a medial pivot TKA design.

In vivo kinematics were determined for 17 clinically successful total knee arthroplasties during a stair-climbing activity using lateral fluoroscopy and shape matching techniques. All three groups showed similar medial pivot motions. PCL retained knees showed significantly greater tibial internal rotation than PCL resected knees for flexion of 30° and greater. Rotation of the PCL resected knees was midway between PCL resected and PCL retained knees respectively. Regardless of PCL treatment, patients with medial pivot total knee arthroplasties had medial pivot motion patterns during stair climbing activities. This study showed a clear and intuitive trend in motions with PCL treatment, such that with partially released PCL's had kinematics midway between those where the PCL was either fully maintained or fully resected.

PREVENTION OF VENOUS THROMBOEMBOLISM FOLLOWING TOTAL HIP REPLACEMENTS, THE VIEW FROM THE OPERATING ROOM

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Background: Over the past decade, several modifications have been introduced to uncemented femoral stems. The design of the stems, however, still classically fall under two categories: anatomical and straight. The purpose of this paper is to report the first clinical, radiographic and periprosthetic densitometry results of a cementless total hip arthroplasty performed with an off-the-shelf extended metaphyseal loading device.

Fifty-eight consecutive patients who received approximately loading non-cemented hip prosthesis were followed for an average of 4.4 years. Patients were clinically and radiographically evaluated at 3 weeks, 3 months, 6 months, 1 year and yearly thereafter. In addition, a group of 8 consecutive patients were studied with Dual X-ray Absorptiometry Scans(DXA) at the same intervals during the first year and at 18 months after surgery.

The extended proximal geometry of the device allowed for initial and secondary stability reflected by the low subsidence values over time. The maintenance of periprosthetic bone stock over time and the absence of stress shielding can be explained by the proximal loading pattern of the stem.

CERAMIC ON CERAMIC: WHY TO INCREASE THE DIAMETER

Fabrizio Macchi Ceramic Tec AG

Volumetric wear study in metal-polyethylene bearing couple, has demonstrated that the wear rate is reduced by the decrease of the diameter of the ball-heads. On the other hand, small ball-heads introduce some limitations: the stability, the sub-luxation and the dislocation of the prostheses are directly correlated with the diameter and are often cause of failure.

The crosslinked polyethylene, promising lower wear rates, seems to have higher Function Biological Activity (FBA) because of its smaller but more aggressive particles. In '70s, the alumina ceramics has been introduced in the hip prostheses due to its high wear resistance and its bulk material and debris biocompatibility. Laboratory test and long term clinical experience confirmed that the BIOLOX® forte/BIOLOX® forte bearing couple offers a reduction of two orders of magnitude of the linear wear rate (in vivo results 0.005 mm/year) if compared with metal-polyethylene (0.2 mm/year), it does not produce reaction[2] and it has a high reliability (fracture rate =...
MINIMUM 10 YEAR CLINICAL, RADIOGRAPHIC AND DENSITOMETRIC FOLLOW UP OF AN OFF THE SHELF "LATERAL FLARE" THR FEMORAL COMPONENT DESIGN
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This is a report on the first 100 THR patients treated with an off the shelf version of a novel "Lateral Flare" femoral component. A prior published report has documented the up to 19 year follow up of custom fabricated stems of an identical design concept as being successful in patients <55 years of age.

ULTRA-SHORT ANATOMIC NECK SPARING CEMENTLESS FEMORAL STEM: EARLY OUTCOME IS PREDICTABLY SUCCESSFUL
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Architectural changes in occurring in the proximal femur (resorption) after total hip arthroplasty (due to stress shielding) continues to be a problem. In an attempt to reduce these bony changes the concept of short and femoral neck spacing stem designs have been advocated. The purpose of this study was to evaluate the clinical and radiological results, especially stem fixation and bone remodeling of proximal femur after total hip arthroplasty.

A total of four-fifteen patients (fifty-five hips) were included in the study. There were twenty men and twenty-five women. The mean age at the time of operation was 53.9 years (range, twenty-six to seventy-five years). Clinical and radiological evaluation were performed. Follow-up radiographs were carried out on all patients one week after operation and at the final follow-up examination. The mean follow-up was five year (range, one to two years).

The mean preoperative Harris hip score was 45 points (range, 15 to 48 points), which improved to a mean of 96 points (range, 85 to 100 points) at the final follow-up with only 1 patient complaining of a minor stage.

No acetabular or femoral osteolysis was observed and no hip required revision for aseptic loosening of either component. One hip (2%) required open reduction and fixation with a cable for calcral femoral osteolysis.

Bone mineral densitometry revealed a minimal bone remodel in the acetabulum and proximal femur.

The geometry of this ultra-short anatomic neck sparing cementless femoral stem has proved to provide effective initial stability even without the diaphyseal portion of the stem. We believe that femoral neck preservation and lateral flare of the stem provide an axial and torsional stability and more natural loading of the proximal femur.

UNCEMENTED CUSTOM FEMORAL COMPONENTS IN HIP ARTHROPLASTY. A PROSPECTIVE CLINICAL STUDY.
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18 years ago laboratory studies were started to develop a CT-based un cemented customised femoral stem in order to optimise the fixation and strain distribution to the proximal femur in un cemented femoral components. An individual design also aimed to optimise the biomechanics of the joint and to enable use of un cemented stems in femurs with abnormal shape and dimension. The developed prosthesis has now been in clinical use for 13 years.

The aim of this paper is to present the preliminary results of a prospective clinical study of this prosthesis.

Results: Overall method: 68 patients had operated. 58.8 % of the patients were women. Mean age was 51 years (20-69). 42.3 % of the hips were dysplasia. A high number of hips without major anatomic abnormality of the proximal femur were involved. The proximal femur were designed to obtain a neck anteversion of 10 degrees after insertion, optimised medial femoral head offset and correction of leg length discrepancies up to 3 cm. All patients were followed with radiological and clinical examination. Merle d’Aubigné score was used. RSA and DEXA-studies have been performed in some groups of the patients. Finally, study of the gluteal muscular function in the hips with optimised medial femoral head offset after insertion of custom stems was compared to hips where optimisation had not been achieved with use of standard stems.

Results: We experienced that use of this type of prosthesis is very simple and offers obvious advantages in abnormal size and geometry of the upper femur. Nine patients sustained a periarticular prosthesis in the proximal femur (1.3%). These were treated successfully with cerclage wires. Eight patients sustained a femoral fracture by a fall accident. Four fractures healed after osteosynthesis without loosening of the prosthesis. A long stem prosthesis had to be used in this patients. No case of loosening was seen except in one case where a non-union after subtrochanteric osteotomy prevented stem fixation. Dislocation occurred in ten hips (1.5%). In four of these the acetalular component had to be replaced. Average total score at 7 years (125 hips) was 17.1 (preop 9.4), at 10 years (56 hips) 17.0 (preop 9.4). The pain scores at the corresponding observations were 5.7 (preop 2.7) and 5.6 (preop 2.8). DEXA-studies showed comparable...
remains highly successful since its inception in 1979. We have performed primary cementless THA with the Profemur Z system (Wright Medical Technology, Inc.) mainly for dysplastic hip. The concept of Profemur Z with a modular neck system is the same as the Zweymuller stem. Postoperative flexion-retraction of cementless femoral stem. Traditional templating for dysplastic hips often led to errors in sizing, cup positioning and femoral stem direction. A CT-based surgical planning system called Hip-Op is a three-dimensional computer-aided planning system that uses DICOM images to represent the relevant anatomical objects by means of multiple views. The purpose of this study was to evaluate the usefulness of the Hip-Op system in accurately predict implant size, insertion angle and the fixation manner of the femoral stem. Materials and methods: One hundred and three non-selected, consecutive THA in 56 patients were performed as primary cementless THA with the Profemur Z system by the same surgeon. There were 81 women and 15 men in this group, with a mean age at surgery of 63 years (range 35 to 87 years). Postoperatively, the predicted implant sizes planned with Hip-Op system and with standard X-ray templates were compared to the actual components selected at the time of surgery. Clinical evaluation was done using Harris Hip Score (HHS). The femoral stem was evaluated in both the anterior posterior and lateral projections of the radiographs. Insertion angle and the fixation manner of the femoral stem were also examined postoperatively using X-ray and CT. Results: 3D templating with Hip-Op system accurately predicted the exact size of the femoral component 63% of the time. It predicted 96% of the components within 2 sizes 100% of the time. Acetabular was correctly predicted 80% of the time, within 1 size 98% and within 2 sizes 100% of the time. Conventional templating predicted the correct size 88% of the time. Fewer femoral components, and 66% in acetabuli, within 1 size 76% and 82%, within 2 sizes 89% and 92%, respectively. The average preoperative HHS was 46.3 points and the latest HHS was 92.2 points on average. Three patients required slow physiotherapy due to greater trochanteric fractures. Two patients were suffering from anterior dislocation. There was no femoral component subsidence. The insertion angle from neutral position of the stem was 0.4 degree in A-P view, and 1.6 degree in profile view. The fixation manner of the Zweymuller stem in the canal was obtained by contact with the four corners of the stem in 67.3%, three corners in 16.7%, two corners in 70%, respectively. Discussion: The Zweymuller stem design provides primary axial stability through its dual longitudinal taper and primary stability through the contact with the corners of the stem to cortical bone in the canal. This study clearly shows the advantages of CT-based 3D templating over conventional X-ray templates. The surgical planning Hip-Op system is accurate and useful, especially for dysplastic hips.

PREOPERATIVE THREE-DIMENSIONAL PLANNING FOR FEMORAL COMPONENT – CORTEX/STEM RATIO MAPPING ON STEM SURFACE
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Introduction: Three dimensional preoperative planning for each patient has been done in our institution. Anatomical designs of prosthesis are necessary to realize primary stability. The purpose of this study is to visualize the area of contact and confirm intra and postoperative stability of THA.

Methods: A preoperative three-dimensional planning based on CT-scan data was performed. Two different contour lines of femur (Versys and Revelation) were studied for each patient.

Distance from central axis of the stem to inside wall of the femoral cortex (A) and distance from central axis of the stem to the surface of the stem (B) were measured.

We defined B/A as cortex-stem ratio and mapped it on the surface of the stem like contour lines.

Results: Cortex-stem ratio of Versys stem of proximal femur indicated over 90% at medial, but no more than 70% at anterior, posterior and lateral. In a circumference of dial stem, that ratio was higher. On the contrary, cortex-stem ratio of Revelation represented 90-100% at medial and lateral,85-95% at anterior portion.

Discussion: High rate region of cortex-stem ratio repre- sentated the physiological condition of the proximal femur. The region is expected to provide satisfactory primary stability of the femoral stem. The stem position was mapped at medial, anterior and lateral,85-90% at anterior portion. This study clearly shows the advantages of CT-based 3D templating with Hip-Op system accurately predict implant size, insertion angle and the fixation manner of the femoral stem.

SELECTION OF REVELATION STEM USING: 3-D PREOPERATIVE COMPUTER PLANNING SYSTEM
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Introduction: The success of cementless THA (total hip arthroplasty) is crucially dependent on the accurate size and accuracy of stem orientation. Selection of the optimal stem only by plain X-ray is not so easy. Because deformity varies in each case and it is impossible to obtain profile view of the hip. As osteoarthritic patients tend to develop external rotation contractures, the preoperative planning for dysplastic hips often led to errors in sizing, cup positioning and femoral stem direction. The use of CT as a planning tool is helpful. We have performed primary cementless THA with the Profemur Z system in 30 patients. In 26/30 cases (86.7%), the correlation coefficient R was 0.99 ± 0.01 over the range 0-1000 Hz is proposed as an endpoint criterion. Non-cemented custom made stem insertion was studied in 30 patients. In 26/30 cases (86.7%), the correlation coefficient between the last two FRFs was ±0.99 when FRFs had been measured for per-operative use. The prosthesis neck is attached to a shaker using a coupling provided with a clamping system. The excitation is realized through white noise in the range of 5-12.5 kHz, inputforce was measured with a transducer of approxi- mately 0.5 SW into the femur-prosthesis system. The input force and the response acceleration are measured in the same point with an impedance head mounted between the shaker and the stem. The Frequency Response Function (FRF) is measured and recorded by a Pimento vibration analyzer connected to a portable computer provided with the appropriate software. All equipment is installed in the surgical theatre but outside the so-called laminar flow area.

The surgeon inserts the implant in the femoral canal through repetitive controlled hammer blows. After each blow, the FRF of the implant-bone structure is mea- sured directly on the prosthesis neck. The hammering is stopped when the FRF graph does not change notice- ably anymore.

The change of FRF between insertion steps is quantified by the Pearson’s correlation coefficient R between successive FRFs. A correlation between the FRFs of successive stages of R (0.99 ± 0.01) over the range 0-1000 Hz is proposed as an endpoint criterion.

WHAT IS ANTEVERSION, WHERE IS IT LOCATED, HOW DOES IT EFFECT TO THE STEM DESIGN AND HIP ARTHROPLASTY?
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One of the most important characteristic of the development dysplastic hip (DDH) is high anteversion in femoral neck. Shaft-neck angle is also understood to be higher (i.e. coxa-valga) in DDH femora. From this understanding many DDH intended stems were designed having larger neck shaft angle.

According to the result of our prior study; reported in [12], using computer-assisted 3-D virtual planning of a surgery of high fit-and-fill lateral flared stem into high anteversion patients, it was revealed that the geometry of proximal femur itself does not have big difference from normal femur, and they are only rotated blow lessetrochanter.

It is very important to know what anteversion is, and where anteversion is located, to design a better stem and to decide more proper surgical procedures for DDH cases with high anteversion.
graphically. The presence of radiolucent lines, vertical or horizontal migration of acetabular cup (> 2 mm), and osteolysis were also evaluated.

Results: At final follow-up evaluation after revision, the average Harris Hip Score was 91.3. There were no revised stems with head center inset below 12 mm in head center height period. In 6 hips (14.3%), minor complications were observed: 3 heterotopic ossifications, 2 dislocations, 1 infection. No revision was necessary for the treatment of these complications. There were no complications with radiolucent lines, vertical or horizontal acetabular cup migration or osteolysis during the follow-up period. In 21 hips with bone graft, incorporation of grafts was observed radiographically at final follow-up examination.

Conclusions: Our data showed that clinical and radiographic outcomes after revision THA using third generation ceramic-on-ceramic bearings were favorable. Revision THA with the use of ceramic-on-ceramic bearing surfaces can be preferentially considered especially in young patients. Further studies with long-term follow-up data are warranted.

PRIMARY FIXATION OF FINITE ELEMENT MODEL OF IMC STEM EVALUATED BY MICROMOTION

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Primary fixation of cementless hip prostheses is related to the shape of the stem. When there is a complication of loading in several directions, the mechanical fixation of a hip stem is considered to provide good primary fixation. The purpose of this study was to evaluate whether the IMC stem with its characteristic fixation method, which was developed by a group at Kitasato University, contributes to primary fixation by finite element analysis. Analysis was performed at a friction coefficient of 0.1 with automatic contact, under the restriction of the distal femoral end. The following three loading conditions were applied: i) step loading of the joint resultant force in the region around the hip stem, ii) loading in the rotational direction, simulating torsion, and iii) loading of the femoral head equivalent to that during walking. Micromotion of the IMC stem along the x-, y-, and z-axes direction was calculated by simulation, and the stress distributed on the stem and femur was determined. Micromotion along the z-axis, which is a clinical problem in hip prostheses stems, was lower in the IMC stem than in other stems reported. Micromotion of the stem along the x-axis, indicating a risk of sinking. The interlocking mechanism, which is a characteristic of the IMC stem, functioned to suppress its micromotion, indicating that the locking method of this stem contributed to the stability. Since no stress concentration was detected, it was considered that there are no risks of breakage of the IMC stem and femur. It was suggested that effective fixation of the finite element model of the IMC stem can be achieved because the micromotion and stress level are appropriate for primary fixation.

INVESTIGATION OF BUFFERED IMPLANT FIXATION IN RAT MODEL: MEASUREMENT OF INTERFACE STRENGTH IN COMPARISON WITH CEMENTED IMPLANT FIXATION

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We suggested a new concept of buffered implant fixation. It is a cementless fixation using a buffer instead of the cement between the bone and the implant. We investig- ated the feasibility of the buffered implant fixation using a rat model. In our previous study, we measured the amount of bone around the implant to compare the buffered implant fixation with the cemented fixation. The results showed the difference in osteoconduction of Volume/Total Volume (BV/TV) with time between the buffered fixation and the cemented fixation. Now, in this study, we are comparing the mechanical interface strength between two fixations. After micro CT scanning, the specimens were used for mechanical push-out test to measure the interface shear strength at the buffer-bone or cement-bone interface. The distal side of the femur was carefully removed to expose the whole distal region of the implant while the proximal side of femur was cut carefully with diamond saw (Metaw, RKB Inc., Korea) until the proximal end of cement or buffer is exposed. The femur was embedded into a para-wax block. The paraffin block was mounted in a material testing machine (KSU-10M, Kyungung testing machine, Korea) and loaded at a rate of 0.01mm/s. The apparent interface strength was calculated by the peak force by the surface area of the buffer or cement. After 2 weeks, the apparent interface strength is 217.0 ± 280.0 (average a standard deviation) for buffer and 472.4 ± 381.1 for cement; after 4 weeks, 92.9 ± 67.6 and 268.1 ± 197.9; after 12 weeks, 441.9 ± 467.1 and 201.8 ± 132.3, respectively. The buffered fixation showed gain in strength with time while the cemented fixation showed reverse tendency but the interaction by ANOVA was not significant (p=0.125). Even though the level of individual test was not clear, the mean result of the test was clearly consistent because of small sample size and high variance, the feasibility of the buffer fixation was shown.

However, further studies are necessary to improve the bone ingrowth of the buffer.

OBJECTIVE: Establishment of the new method to evaluate fill of the hip stem.

Background: The fill of the hip stem is one of the important parameters to estimate the quality of planning or fixation of the cementless stem. It has been defined as a stem-canal width ratio on the A-P plain of X-ray images so far. However, it is quite a problem to get the correct AF images on basis so that positional difference may affect the measurement. According to our data, the fill was measured significantly different in 15, 30, 45, 60 degrees erroneous direction. First, we tried to figure out the fill of the hip stem three-dimensionally rather than two-dimensionally. Next, our new method was compared to conventional method.

Material and Methods: Leg CAT scans were performed on 32 hips of 20 patients (2 male, 18 female). Images of the canal of femora were reconstructed using CAD software. We made 2-types of canal model with or without lesser trochanter. The geometries of our lateral stem fixations with different sizes were compared to each canal geometry in the CAD software and proper size was decided. Then images were observed from an accurate vertical direction of the corona plain of the stem. We measured the 2-D fill on this plane and the 3-D fill of each model. The 3-D fill of lateral stem from the stem above the 100mm below the head of lesser trochanter line (reference line). We also examined the stems 1-size smaller or larger than the appropriate ones.

The mean value of angle was 61.114 (range 24-82). The average of 3-D fill of Lateral flat stem was 51%/59% with/without lesser trochanter, and 2-D one was 74%/77%. The numerical and distributional results by these two methods to measure fill were alike but different. For example, in case without lesser trochanter, the 3-D fill showed the maximum value in the area just below the reference line. The maximum 2-D fill was measured in 10mm caudal from the reference line. In general, this stem occupied much space in the distal area and around the lesser trochanter.

Future Plan: Extension of this evaluation method into various kinds of stems.

THE UTILITY OF PRE-OPERATIVE CT BASED SURGICAL PLANNING IN THA USING THE PROFEMUR Z

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Introduction: ‘Fit and fill’ of the femoral component was originally thought essential for stability of cementless stems. However, the Zweymuller stem was designed for ‘fit without fill’ (particularly flat tapered stem) and
heads. And also, the surface roughness increased in the order of XSG-alumina < SG-alumina < metallic head. The alumina ceramic femoral head showed the restrained surface whereas the metallic head showed the protruding surface. When third-body wear occurs during the clinical use, generally restrained form may occur on the ceramic surface whereas protrusion form may occur on the metallic surface. We have good clinical results more than 20 years using the SG-alumina, and clinical results for a long term will be expected with XSG-alumina on improved microstructure.

**MID-TERM PERFORMANCE OF THE THIRD GENERATION CERAMIC ON CERAMIC ARTHRROPLASTY**

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The purpose of this study is to analyze clinical and radiological results of total hip arthroplasty using the 3rd generation ceramic on ceramic articular surface.

Between July 1999 and May 2005, 339 hips of 250 patients had primary cementless total hip arthroplasty with the 3rd generation ceramic on ceramic bearing implants. 285 hips were followed up over 3 years. Male were 168 patients(237 hips) and female were 68 patients(88 hips). The mean age at the time of operation was 47.3(range, 25–76) years old and the mean follow-up was 62.4(range, 36–105) months. The preoperative diagnoses were osteonecrosis of the femoral head (ONFH) in 250 hips, secondary osteoarthritis in 55 hips(displasia in 35, infection seque- lae in 12, LCP in 2, CDH in 2), hemophilic arthropathy in 9 hips, ankylosing spondylitis in 7 hips etc.

We used Bicontract system(Aesculap, Germany) in 65 hips, Secur-FitTM(Stryker Howmedica Osteonics, USA) in 206 hips. Trilogy(Third generation ceramic on ceramic bearing system) were very satisfactory and one case of loud squeaking which happened after fall for O.A. A c.c. head (28mm or 32mm) and poly bearing in a cementless cup were used for all patients. Selection of neck position was made for all patients. Results: 635 of all head-neck positions were other than neutral, There were 6 dislocations, no significant leg length discrepancies (<5mm), and 0 infections. There was one case of dislocation to a post-op per-prosthetic fracture at 3 years that was treated with a long cement- less stem. 1 death due to a PE ten days post-op. 1 intra-operative calcar fracture wired and healed uneventfully. 1 intra-op greater trochanter fracture that was treated with screws. 2 neck fractures revisited to cementless stems.

**DESIGN CONSIDERATIONS AND RESULTS**

**RESULTS**

This study suggests that the squeaking would be one of the most important yardsticks to ensure proper restoration of joint mechanics. Fatigue properties have significantly improved and no additional neck fractures have occurred.

**SELF CENTERING MECHANISM IN BIPOLAR ENDOPROSTHESIS – IS IT EFFECTIVE?**

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Bipolar hip arthroplasty was introduced to alleviate the problems of femoral head necrosis and femoral ra-

rional stem loosening associated with unipolar prosthesis. Earlier generation bipolar endoprostheses used to cause varus fixation of outer head which led to the unaccept-

able high incidence of dislocation, component disas-

semblly and fractures of the polyethylene bearing insert.

Second generation endoprostheses with a self centering mechanism were introduced to overcome these prob-

lems. This new design incorporates a polar offset by set-

ting the center of rotation of the inner head proximal to the center of rotation of the outer head, which generates a valgus producing moment at the outer cup. There is a controversy whether this mechanism works in vivo, and so called stovepipe canals which make initial stability of the implant’s orientation, even in our series we have achieved neutral neck in most cases. To obtain better func-

tional outcome we are studying a device based on gait analysis and superficial electromyography to calculate pre and post operative off-set. The data that we have achieved are still too few to be able to produce results; if there is possible, presenting them in future editions.
When 25° retroverted changeable neck was used, ROM was achieved with CA between 30° and 50° without CA adjustment. The use of changeable necks allows for anteversion or retroversion, there was a limitation of the range of internal rotation at 90° and range of external rotation was less than 60° group, the range of external rotation was less than in excessive anteversion or retroversion, because of the bone impingement between the greater trochanter and the posterior acetabulum.

The cemented and cementless implant fixations are popular in orthopedic arthroplasty. However, these implants have some problems such as cemented hip implant failure, wear debris, stress shielding, revision and so on. To overcome these problems, we are developing a new concept of buffered implant fixation which uses a bone-friendly buffer between the implant and the bone.

In this study, we performed a finite element analysis to evaluate the buffered implant fixation in comparison with cementless implant fixations in mechanical aspects. In addition, we investigated the effect of buffer taper angle to the stress distribution in the buffered implant fixation.

Three-dimensional finite element of the cemented, cementless and buffered implant fixation were performed using the ABAQUS program. In these FEA, the ‘standardized femur’, which is the composite femur model supplied by Paciﬁc Research Lab., was used as the bone model and the CPT stem and the Versys Fibermetal Midcoat stem were modeled for the cemented fixation and the cementless fixation, respectively. These three-dimensional models were meshed using the tetrahedral elements with 4 nodes (C3D4) and the additional contact deﬁnitions. The buffered implant fixation is similar with the polished cemented fixation except the material between the implant and the bone. The polished surface was considered as the buffer material. Also, several taper angles of buffer were simulated to change the stress distributions in the buff-ered fixation. The external load three times of mean body weight (70 kg) was cyclically loaded at the femoral head with the angle of 20° in adduction and 6° in ﬂexion while the distal end of femur was ﬁxed.

In the buffered implant ﬁxation, the taper-locked effect of bone’s elastic line to the bone’s surface provided the bone-friend buffer between the implant and the bone. The risk factors in the buffer were 0.148 for the tension and 0.176 for the compression while, the risk factors of cement in the polished cemented implant ﬁxation were over than 1. Moreover, the buffered ﬁxation had widely distributed compression compared to the cemented ﬁxation and the stress distribution could be modiﬁed easily to change the taper angle of buffer. The FEA results showed that the buffered ﬁxation of bone-friendly implant should provide an appropriate mechanical environment.

The mean duration of follow-up was 3.8 years, all hip joints function was improved, and the ﬂexion deformity of the involved hips were disappeared. The range of hip ﬂexion were 75°–105°(average 86.2°), and the range of hip extension were 5°–15°(average 8.7°), the average Harris score was from 32.8 pre-operation improved to 88.2 post-operation, the patients experienced no pain on doing any activity of daily living. Hip pain and thigh pain through all the follow-up period are in 2005 and 2006. In this study, 12 patients (28 hips) underwent bilateral total hip replacement, other 6 patients (12 hips) underwent twice operations. We used Harris score, assessment of the joint pain, range of motion to make sure the curative effect of the surgical strategy.

Bilateral total hip replacement is an effective treat-ment for ankylosed hip joint caused by late ankylosing spondylitis, early rehabilitation intervention is useful for the functional recovery of the joints.

The purpose of this study is to evaluate the clinical and radiographic results of 20 patients(27 hips) who underwent primary bipolar hemiarthroplasty with non-cemented femoral stem and biarticular cup from Janu-ary 1989 to April 1999 who were followed for more than nine years. Average follow up was 13.4years(range 9-19years). The type of non-cemented femoral stem was Harris-Galante type in ten hips, Multilock porous coating in seven hips and Multilock porous and tricalcium phosphate coated stem in ten hips. The etiol-ogy of osteonecrosis of the femoral head was idiopathic in eleven hips, alcohol abuse in twelve hips and steroid administration in four hips. According to Ficat’s grading system, all twenty-seven hips were in stage. Clinically, we evaluated the Harris Hip scores. We also evaluated the radiographic measurements around the femoral stems and the bipolar cup.

The average Harris Hip score improved from 37.2 points to 89 points; and 2(7.4%)hips were associated with thigh pain and 3(18.5%) hips with groin pain. Around the femoral stem there was progression radiolu-cent line more than 1mm in width in (13.7%) hip, and osteolysis was present in 9(33.3%) hips. On evaluation of radiographs for stability of fixation, we found that 21 hips(77.8%) showedeosie in growth,Ship(18.5%)
WAR MAPPING ANALYSIS WITH RETRIEVAL 28MM COC-COCR HIP BEARINGS – 11 YEARS EXPERIENCE
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While there are many variation laboratory and clinical studies using metal-on-metal (MOM) bearings after introduction of the 28MM MOM THR in 1998, the mapping of wear phenomena in such retrieval cases has been minimal. In laboratory study, 28MM MOM bearing wear-rate was low with “run-in” and “steady-state” than large diameter MOM without theory of bearing’s wear-rate was low with “run-in” and “steady-state.” Wear mapping of wear phenomena in retrieval cases is push up antero-laterally with the hip hyperextension, and full porous cylindrical stem is easily inserted in this group. The main surgeon decided each surgeons to cases that failed due to hip loosening or impingement. The main surgeon decided each surgeons to cases that failed due to hip loosening or impingement. We inves- tigated the early result of these patients.

There was a relationship between patients’ height and the length of skin incision (p<0.05). There were no significant differences between two groups of proved in CRP, CRP, and D-Dimer (CRP: 13.9±1.9mg/dl, D-Dimer: 0.5±0.8mg/dl, D-Dimer: 6.1/5.3mg/dl). Both intraoperative blood loss and operation time were less in MIS group (blood loss: 620ml, operation time: 85min vs. 115.4min (p<0.05). The days until the patient was able to do active straight leg raising were 17.3 in MIS group and 22.4 in standard incision group and hospital stay days were 26.7 vs. 29.2. But no significant differences were proved in hospitalization. On roentgenographic find-ings, the inclination of acetabular cup was 42.0 degree in each group. There were no revision cases in this study until the final follow up.

In the present study, intra-operative hemorrhage and operation time were significantly less in MIS group. It was supposed that at the patient selection, each surgeons decided the candidate of MIS due to patient’s hip condi-
tion. But in another situation, no significant difference was found for example in serum CRP, CRP, and D-Dimer levels. Clinical and radiological outcomes were not significantly different between MIS and Standard group in this study.

We developed a modified posterior approach that preserved the short external rotator muscles to prevent dis-
location after THA or BHA. The present study aimed to evaluate the effectiveness of short external rotator preserv-
ing posterior) (ER) approach for bipolar hemiarthroplasty in treatment of femoral neck fractures in patients with neurologic disorders. Between March 2004 and February 2006, we performed 187 cementless bipolar hemiarthroplasties for displaced femoral neck fractures on 36 patients with neurologic disorders, who were operated on by ER approach (Group 1) and 151 patients without neurologic deficits, who were operated on by conventional posterior lateral approach (Group 2). We compared operation time, the amount of blood loss, the perioperative postoperative complication rates, the dislocation rate within 1 year, and duration of hospital stay between two groups.

The amount of blood loss was significantly decreased in group 1 (p<0.01). There were no significant differences in mean operation time and early postoperative complication rate including wound problem, thrombosis or infarction, and hospital stay. There was no dislocation after operation in group 1, but seven patient (4.6%) had dislocation in group 2. Nine patients (25.0%) died within postoperative 1 year in group 1 and twenty six patients (17.2%) died in group 2.

Cementless bipolar hemiarthroplasty through ER approach provides a favorable outcome for treatment of displaced femoral neck fracture in patients with neuro-
logic disorders who is considered as high risk of disloca-
tion. Also, it decreases the postoperative blood loss and the needs of postoperative abduction brace.

DIRECT ANTERIOR APPROACH IN LATERAL POSITION: EASY AND TOLERABLE MINIMALLY INVASIVE TOTAL HIP ARTHROPLASTY
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Direct anterior approach (DAA) in supine position is one of the successful minimally invasive surgery (MIS) especially when the neck or linear stem selection is limited. DAA in lateral position is easy and full porous cylindrical stem is easily inserted in this approach. The purpose of this presentation is to report this technique and result. 55 patients with osteoarthritis (Crowe group 1 to 3) were undergone THA with DAA in lateral position and followed for a minimum of 7 months. Approach and cup settlement is the same usual DAA in supine position. After liner placement, proximal femur is pushed up antero-laterally with the hip hyperextension, external rotation and adduction, which make excellent view of femoral neck cut surface. Because the leg is short-
ened, neurovascular relaxation is achieved. PCI retractor of TKA instrument is used to keep tensor fascia femoral muscle laterally over greater trochanter. No other special instru-
ment is needed in stem insertion. Hip scores were 96.3 at 1 year and 76.4 at 2 years. The dislocation rate was postopera-
tively. Mean incision length was 9cm and mean operation time was 85minutes including routine intra-operative X-ray check. Neither auto blood donation nor cell saver was used. Blood transfusion was not needed. Stem posi-
tion with over 2 degree varus were in 5 cases (9%) and over 2 degree valgus were in 3 cases (5%). There were no dislocation, loosening, infection, or femoral nerve injury.

The two-incision technique uses strategically located incisions to insert the prosthesis components in to spe-
cific intermuscular or internervous planes in an effort to minimize damage to these tissues. Even though there

TREATMENT OF FEMORAL NECK FRACTURES BY BIPOLAR HEMIARTHROPLASTY THROUGH SHORT EXTERNAL ROTATOR PRESERVING MIS APPROACH IN PATIENTS WITH NEUROLOGIC DISORDERS
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We developed a modified posterior approach that pre-
served the short external rotator muscles to prevent dis-
location after THA or BHA. The present study aimed to evaluate the effectiveness of short external rotator preserv-

BILATERAL SIMULTANEOUS TWO-INCISION MINIMALLY INVASIVE TOTAL HIP ARTHROPLASTY
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