MATERIAL AND METHODs

The present follow-up study (non-randomized) has been conducted on 50 cases of intra-capsular fracture neck of femur above the age of 60 years admitted in department of orthopedics Government Medical College and Rajindra Hospital, Patiala. Out of 50 cases which were selected intra-operatively of Garden type III and IV, 25 will be those in whom cemented bipolar prosthesis will be used while in other 25 total hip replacement will be done and this is to be decided by the operating surgeon either to do PHR or THR depending upon the status of acetabulum, pre-fracture mobility and morbidity as well as general condition of patient. The fracture type has not been included in allocation of procedures.

Patients will be given first-aid in the form of skin traction, analgesics, suturing of wound if any, and antibiotics. Patients will be immunized against tetanus, and shock if present, will be treated. Radiographic examination will be done to assess the type of fracture and displacement.

In the ward, history will be recorded on Performa attached. General physical examination and local examination will be noted. Patient will be investigated for operative and anaesthesia purposes. Any associated medical problems will be taken care of before the patient is taken up for surgery. Pre-operative counseling of patients and his relatives regarding the method of treatment, prognosis will be done and informed consent will be taken.

PREOPERATIVE PLANNING

This aspect is important in choosing appropriate implants and anticipating unusual needs during surgery. In the absence of pelvic obliquity or hip contracture, discrepancy in true leg lengths and in apparent leg lengths on the two sides will be the same. In case they differ as restoring equality in true leg length will result in the patient feeling that the newly operated

leg is either too long, or too short. On AP radiograph of pelvis with both hip joints, mark the "U body" or tear drop at medial-inferior aspect of quadrilateral plate on both sides and connect them. This tear drop line is reference line. Next mark the tip of the lesser trochanter on both sides. Measure vertical height from this point on lesser trochanter to the reference line. The difference in the two sides is the true leg length discrepancy, which will be equalized if there is no fixed pelvic obliquity. If there is, then apparent length discrepancy will be equalized. Using prosthesis X-ray template, locate the desired position of the acetabular component, maximizing bony containment mark the center of rotation on X-ray, then mark a point above the acetabular center of rotation at a distance equal to the amount of additional leg length desired. Choose the femoral component of sufficient size to fill the canal. The template has the mark designating the center of rotation of femoral head with various neck lengths/ head size. Choose the one that will lie on the point above the center of rotation of the acetabulum. Mark the neck resection on the radiograph and measure the distance of the neck cut above the top of the lesser trochanter.

PRE-OPERATIVE REGIME

Patients were shaved of all hair from nipple to toes both anteriorly and posteriorly. Prior to surgery they were made to have a thorough wash with soap and water. Nails were cut shorts. Salt water enema was given 1 night before. Preoperative prophylactic injectable antibiotic were started on all patients from 12 hours prior to surgery and continued till 5 days postoperative. These were then switched over to oral antibiotics. All patients were started on cefuroxime 750 mg after test dose every 12 hourly. Injection amikacin 500 mg also given 12 hourly. Dose was adjusted according to the body weight and renal function of the patient.Fresh sterilized gowns and gloves were kept for each case. Instruments were autoclaved thrice and Operation Theatre was fumigated. The operation theatre door was closed, not to be opened before the operation was completed. All operating surgeons and

staff nurses scrubbed for ten minutes and double mask and gloves were used for surgery. The 750 mg cefuroxime was also given intra-operative. Urinary catheter was introduced in all patients just prior to surgery.

PRE-OPERATIVE PLANNING

Pre-operative planning provides enough information to treating surgeon and forces him to think in three dimensionally to avoid various complications. This gives better functional outcome as well as patient satisfaction.

RADIOLOGICAL PLANNING

This is an important part of the preoperative planning. Surgical decisions such as implant selection, bearing type and mode of implant fixation (cemented versus uncemented) are influenced by age, sex, preoperative diagnosis, activity level and mental status. A systematic assessment of the lumbosacral spine and knee is performed to identify any extra-articular sources for hip pain. Flexion contractures, previous scars and a neurovascular exam are then performed. True and functional LLDs should be carefully evaluated and recorded. Pelvic obliquity can be evaluated by comparing the level of both hemi-pelvises with the patient sitting and standing, and if present, the surgeon should assess whether its origin is suprapelvic, intrapelvic or infrapelvic. In the seated position, suprapelvic obliquity per sists usually secondary to a fixed lumbosacral scoliosis. In contrast, intrapelvic and infrapelvic obliquity resolve in the seated position.

TECHNIQUE

The standard preoperative radiographs for THA includes three radiographs: an anteroposterior (AP) view of the pelvis and an AP and lateral of the affected hip. The AP pelvis view is centered over the pubic symphysis and includes the proximal third of the femur to allow for templating. The AP views are obtained with the patient positioned supine on the radiographic table with the lower limbs in approximately

15°±5° of internal rotation to allow a true AP view of the femoral neck, which has a normal anteversion of 15°±5° A well done AP pelvis view should have neutral pelvic rotation and tilt. To determine the proper pelvic rotation, the pubic symphysis should project on a line through the center of the sacrum and coccyx, and the two obturator foramina should appear symmetrical. The pelvic tilt is estimated by the distance between the upper border of the symphysis and the center of the sacrococcygeal joint. This distance should be 2-3 cm above the superior end of the symphysis in males and between 2-6 cm in females. This distance is increased when the pelvis. Is tilted forward, and the AP view is close to an inlet view. Conversely, this distance is decreased when the pelvis is tilted backwards, and the AP view is close to an outlet view. In patients with a fixed external rotation contracture who cannot internally rotate their hips, a posteroanterior (PA) view of the femur should be obtained. This PA view is obtained with the patient positioned prone on the radiographic table with the contralateral hip elevated to an angle equivalent to the contracture. The most frequently used lateral view of the hip is a modification of the frog-leg (Lowenstein) lateral view and is obtained with the patient positioned supine on the radiographic table with the affected hip externally rotated and the knee and ankle flat on the table. This view is used for locating proximal femoral entry point in the piriformis fossa. Additional Bone quality and the geometry of the proximal femur can be assessed using the indexes of Singh and Dorr. The Singh index is commonly used to assess osteoporosis and is based on the density of trabecular bone of the proximal femur" and the Dorr classification, classifies the geometry of the proximal femoral canal. Both indexes contribute to decision making on implant type and mode of implant fixation.

RADIOGRAPHIC TEMPLATING

1) Magnification: Usually with the X-ray tube at 100 cm from the top of the table and the X-ray tray placed 5 cm below the table, magnification is 20% (± 6%, 2 SDs) as soft

tissues are interposed between the hip and the X-ray plate. Attention should be paid to the patient's body habitus because magnification is directly proportional to the distance between the pelvis and the film. Therefore, increased magnification should be anticipated in extremely obese patients and, conversely, less magnification would be expected in extremely thin patients. If the radiographies are digitized, they must be calibrated before templating. A radio-opaque marker such as sphere which is 25 mm in size or a coin with a known size is usually used as a calibration tool in order to scale the dimensions shown on the radiograph and the digital templates. These markers should be at the same level of the hip joint in the AP plane

2) Landmarks: Various landmarks are used to convert the 2-D picture of X-rays into a 3-D vision during intraoperative. There are : 1) iloischial line (Kohler's line), 2) the base of the teardrop, and 3) the superolateral margin of the acetabulum at the acetabular side; 4) the lesser and 5) the greater trochanter and 6) the medullary canal at the femoral side. The radiographic teardrop (U-figure) is located in the inferomedial portion of the acetabulum, just above the obturator foramen. The teardrop is a consistent radiographic landmark and In close proximity to the center of hip rotation and the acetabular floor. The ilioischial line, or Kohler's line, is drawn from the medial border of the ilium to the medial border of the ischium, and is a useful landmark when assessing the degree of protrusio acetabuli. The superolateral margin of the acetabulum provides a reference for the degree of osseous coverage around the implanted acetabular component.

3) Leg-Length Discrepancy: To assess LLD, a pelvic horizontal reference line is made using the lower margin of the two teardrops and drawing an inter-teardrop line. If the teardrops are not identifiable, a horizontal reference line can be drawn through the distal aspect of the ischial tuberosities or the distal aspect of the sacroiliac joints The LLD at the hip can be calculated as the difference in the vertical distance between

the horizontal reference line and a fixed point on the femur. Fixed points on the femur could be the lesser trochanter, the greater trochanter or the center of the femoral head. LLD may be present at a level distal to the hip joint, such as in case of bony abnormalities (osteotomies or mal-unions) or functional limitations (hip or knee contractures). In this case, LLD should be assessed on a standing AP view radiograph, with the distance measured between the inter-teardrop line and the floor.

4) Acetabular Templating:

a) COR: This is always done to establish the new COR after component implantation. Using the previously described pelvic radiographic landmarks, the template should be oriented to achieve an abduction angle of 40-45 degree in relation to the inter-teardrop line, with the inferomedial border of the cup seated near the iloischial line, or the lateral edge of the teardrop. The superolateral margin of the acetabulum is used as a reference for the coverage of the cup, and final component size should maximize cup coverage while avoiding excessive subchondral Bone resection. The COR should be medialized in order to decrease the moment arm generated by the patient's body weight during the gait cycle, theoretically reducing wear and improving clinical outcomes In cemented cups, a uniform 2-3 mm space should be left for cement mantle Once final acetabular implant size and position have been determined, the new COR of the hip should be marked and compared to the contralateral side for vertical and horizontal symmetry

b) Lateralized Acetabulum: The cup should be medialized as much as possible in order to gain the proposed benefits of improved postoperative hip biomechanics. The cup template should be positioned in the anatomic position, adjacent to the lateral edge of the teardrop and lateral to the ilioischial line.

5) Femoral Templating:

The goal of the femoral templating is to choose an implant that permits adequate fixation and restores offset and leg length. To achieve this result, it is important to consider both the intra-osseous parameters (stem fixation and alignment) and the extra-osseous parameters (offset and leg length). Stem size is best determined on the AP view radiograph, and depends on stem type choice (straight or anatomic), fixation choice (cemented or cementless) and coating choice (proximally coated or fully coated). For a cemented stem, a uniform 2-3 mm cement mantle should be considered. The entry point (piriformis fossa) and the fit of the stem should be assessed on both AP and lateral views. Once the stem size is decided, the template should be positioned inside the femoral canal, along the longitudinal femoral axis, and the COR of the femoral head should be marked. Attention should be paid in cases of coxa vara or coxa valga. Now, the positions of both centers of rotation (femoral and acetabular) should be checked. The vertical and horizontal distances between those points represent the change in limb length and offset that will be obtained. If the two centers of rotation are overlapped, leg length and offset will remain unchanged. If the COR of the femoral stem lies medially to the COR of the acetabular cup, femoral offset will be increased. Conversely, if the COR of the femoral stem lies laterally to the COR of the acetabular cup, femoral offset will be decreased. If the COR of the femoral component lies more proximally than the COR of the acetabular cup, lengthening of the limb will occur conversely, shortening of the limb will be the result if the COR of the femoral component lies more distally than the COR of the acetabular cup. Once the offset and the femoral head COR are determined, the level of the femoral neck cut can be marked. The distances between the proximal corner of the lesser trochanter and theCOR of the femoral head as well as the proposed neck cut level are also determined at this point

POSITIONING OF THE PATIENT

Proper patient positioning is a prerequisite for accurate exposure and intraoperative assessment the pelvic position during acetabular component implantation After induction of epidural anaesthesia. The patient is positioned in the lateral decubitus position on a well-padded hip table In order to secure the patient so the ASIS is perpendicular to the plane Of the floor and not rotated, the pelvis is secured with padded anterior (pubic) and posterior (sacral) post supports. We also cover the anterior pubic post with an inflatable pad, to improve stabilization and protect the skin from excessive pressure. An inflatable shoulder float is placed below the axilla to avoid injury to the axillary nerve and reduce postoperative shoulder discomfort. The back is also stabilized with a posterior thoracic support to prevent any forward or backward rolling of the body. All of the bony prominences are padded. The nonsurgical leg is secured with a belt in a position of slight hip flexion and 90° of knee flexion. A foam rubber pad is also positioned between the knees in order to retain a neutral position of both extremities.

INCISION AND EXPOSURE

The anatomic landmarks for the surgical incision are marked with a skin marker including the proximal, anterior and posterior borders of the greater trochanter and the vastus ridge In cases of overweight patients, wherein the greater trochanter can be difficult to palpate, rotation of the limb can help in identifying it. A straight skin incision begins in the middle of the femur at the level of vastus ridge and extends 1-2 cm proximally over the posterior corner of the greater trochanter for a total incision length of 8-10 cm. Approximately, one-third of the incision extends proximal to the tip of the greater trochanter Distally, the incision follows the axis of the distal femur, whereas proximally follows the direction of the underlying gluteus maximus fibers and is slightly curved in the posterior direction. In obese patients, a longer incision may

be required in order to avoid excessive pressure on the skin edges. An incision shorter than 6 cm should be avoided, as it increases the risk of skin bruising and blistering. After the skin incision is made, subcutaneous tissue is incised and retracted in line with the skin incision. The fascia lata is also incised in the line of the skin incision, between the middle and posterior third of the greater trochanter along the axis of the femur. The gluteus maximus is gently split along its fibers cranially using blunt finger dissection to expose the proximal part of the great trochanter two cotton laps soaked in saline are applied to the skin edges and a Charnley self-retuning retractor is placed deep to the fascial layer while carefully protecting the sciatic nerve. The leg is positioned in neutral extension, and the hip is gently internally rotated with a padded Mayo stand under the foot for support. The trochanteric bursa is then incised and the fat pad behind the great trochanter reflected posteriorly with a surgical lap sponge. The short rotators are exposed with a Cobb elevator. Haemostasis of the deep medial femoral circumflex vessels is achieved with electro cautery. The piriformis is palpated and separated from the inferior border of the gluteus medius with a blunt dissection to create an anatomic interval. Angled at 90°, Hohmann retractor is placed underneath the gluteus medius in this interval and an Aufranc retractor is placed immediately adjacent to the proximal margin of the quadratus femoris below the inferior capsule and the femoral neck. At the junction of the piriformis and gluteus minimus, the piriformis, conjoined tendon And underlying capsule are released as a single layer from the posterior border of the femoral neck, extending distally to the level of the lesser trochanter. A portion of quadrates femurs muscle may be released in the distal portion of this incision. This creates a single soft tissue sleeve that is then tagged with two nonabsorbable sutures for later posterior soft tissue repair. The first suture is through the piriformis tendon and cap sule and the second suture throught the conjoined tendon and capsule. With further flexion, adduction and internal rotation, the femoral head is then dislocated posteriorly. In

difficult cases, placing a bone hook around the femoral neck may help. The limb is then internally rotated 90° The center of the femoral head is marked with electrocautery and the lesser tro chanter is identified. The distance from the lesser trochanter to the center of the femoral head is measured intra-operatively and compared with the preoperative plan. The level of the neck cut level is based on the preoperative plan. The femoral neck osteotomy is performed with a thin oscillating reciprocating saw, starting from the medial calcar towards the great trochanter (Fig. 8.9). Attention must be paid to prevent notching of the greater trochanter or injuring the sciatic nerve. Care should be taken to make sure the saw blade is perpendicular to the long axis of the femur so as to prevent an oblique femoral neck cut. The head is removed using a tinaculum pointed clamp and a twisting motion to disrupt remnant of the ligamentum teres.

COMPONANT PLACEMENT

1) ACETABULUM PREPRATION AND POSITIONING OF THE ACETABULAR COMPONENT:

After the femoral neck cut is completed the leg is returned to a neutral position. The femur is retracted with an angled C-shaped Hohmann retractor over the anterior wall of the acetabulum. A Steinman pin is placed into the supra-acetabular region (ilum) to retract the gluteus medius and minimus superiorly. The inferior capsule is incised to relieve the tension and a wide angled Hohmann retractor is inserted into the posterior wall of the acetabulum between the labrum and the poste rior capsule using a mallet to gain bone fixation. An Aufranc retractor placed initially inferior to the transverse acetabular ligament and moved above the ligament after further inferior capsular release. The acetabular labrum and overhanging peripheral soft tissues are then excised with a long-handled scalpel, the full circumference of the acetabular socket should be exposed. The pulvinar is excised with a long electrocautery tip to prevent bleeding from the ligamentum

teres vessels. Peripheral osteophytes are generally removed after the cup is impacted in its final position using a broad osteotome and a rongeur The acetabulum is initially sequentially reamed in a progressive and concentric manner with an offset handled reamer The initial reamer is roughly 6 mm smaller than template's acetabular cup size and is inserted directly into the wound in order to remove the medial osteophyte and expose the true acetabular floor (medial wall) Then, the surgeon brings the reamer to the desired lateral abduction and anteversion and the periphery of the acetabulum is incrementally (2 mm increments) reamed to the desired size until sufficiently bleeding subchondral bone is exposed throughout the acetabular wall, and good rim contact with the reamer is achieved. The correct arrangement the retractors, and especially the inferior Aufranc retractor, allow for adequate inferior mobilization of the skin (mobile window) and helps placing the reamers horizontally enough to achieve the desired cup position. After acetabular reaming is concluded, a trial shell is inserted and fully seated to verify size, orientation and stability of the cup. The surgeon, especially beginner, should note the position of the trial shell so that the acetabular cup can be inserted in the same position. Screws can be added to increase fixation if is needed. The monoblock cup is of the elliptical shape, the cup is 2 mm wider in the periphery comparing to a hemispherical cup and reaming is performed to 1 mm below the external rim circumference, thus providing a stable rum fit. With a vertically placed medializing impactor, the cup is initially brought medially. It is then impacted axially to the desired orientation. Before press-fitting the cup, its position is checked with an angle guide who rests on the acetabular rim, and fine adjustments can be made with the impaction of a shovel placed on the appropriate positions of the rim. Once optimal orientation is achieved, the cup is press-fit ted with a ball impactor to its final position. In our practice, for a primary total hip arthroplasty, we opt for a medial and inferior placement of the acetabular cup (in line with the plane

connecting the two teardrop signs in the AP pelvis X-ray), in order to restore the normal hip joint center of rotation and biomechanics. The optimal lateral abduction angle of the cup is considered to be 40°-45°, whereas desired cup anteversion is 15%-25°. Nevertheless, cup anteversion should be always considered in combination with femoral anteversion and the goal should be obtaining a combined anteversion of 25° to 35° for men and 30° to 45 for women

2) FEMUR PREPARTION AND POSITIONING OF THE FEMORAL COMPONENT:

After the actabular cup implantation is completed, the Charnley retractor is removed and the femur is 90° internally rotated, flexed and adducted. Two clean laps are used to protect the skin and a third lap sponge is inserted into acetabular shell to protect the polyethylene and shell. The proximal femur is delivered into the mobile window, and exposure is aided with a narrow femoral neck retractor (modified toothed Aufranc retractor) placed on the anterior neck. An Aufranc retractor is placed along the inferior/medial neck below the lesser trochanter and preferably in contact with the modified Aufranc retractor used to lift the femur. A C-retractor is placed anterior to the greater trochanter into the trochanteric fossa superiorly to separate the gluteus minimus and medius muscles which provides exposure to the femoral neck and protects the abductors during subsequent reaming and broaching of the femoral canal. Once the retractors have been placed around the proximal femur, the remaining lateral cortex of the neck is removed with a curved gouge placed at the junction of the femoral neck and the greater trochanter. The femoral canal is subsequently opened with a rasped cylindrical reamer. Care is taken to lateralize the femoral canal during reaming, in order to avoid varus insertion of the stem.

3) REAMING: Sequential reaming of the distal portion of the canal is performed with a straight reamer, until adequate cortical contact is reached. Broaching of the proximal

femur is then carried out, with the broaches inserted with approximately 10°-15° of anteversion and follows the patient's native version. The posterior neck cortex in relation to the epicondyles of the knee with the leg perpendicular to the floor can be used as a reference for determining anteversion. The broach size is then incrementally increased until adequate fit and rotational stability are achieved. A calcar planer is used to remove any excess bone around the neck of the final trial broach once the handle has been detached. A rongeur may also be used at this time to remove any osteophytes located usually at the anterior aspect of the femoral neck. After usertion of the trial neck and a standard head (+0) of the appropriate diameter, the hip is reduced, and cup coverage and combined anteversion of the components are evaluated. In addition, the hip is brought to range of motion to check for impingement and instability After confirming appropriate positioning, the beach is removed and the chosen implant is inserted Irrigation is not performed before the insertion of the prosthesis as a pres-fit stem is used, and autogenous bone should not be removed from the canal Again, care is taken to maintain the desired anteversion during impaction of the stem to its final position. A final femoral head is impacted onto a clean and dry femoral stem taper.

4) REDUCTION AND CLOSURE:

Once the implants have been placed and reduced, the wound is irrigated via pulsed lavage and haemostasis achieved. The short external rotators, including the conjoined tendon and the piriformis tendon, as well as the posterior joint capsule are repaired through two transosseus holes in the greater trochanter and ideally in the site of the native insertions. The sutures are passed through the drill holes with a suture passer and tied in slight abduction and external rotation to allow the posterior tissues to come in close proximity to the femur. The fascia lata is closed with interrupted 0 Vicryl sutures. The wound is closed in layers. A sterile dressing is then placed over the wound, which is wrapped in a hip spica fashion

using an Ace bandage. The final position of the leg is secured using an abducting pillow.

INTRA-OPERATIVE ASSESMENTS

1) LIMB LENGTH EQUALIZATION

The process of preserving limb length or restoring LLD during total hip begins with preoperative templating. The perpendicular distance between the proximal corner of the lesser trochanter and the inter-teardrop line is measured for both sides and any difference noted represents the LLD that needs to be restored. The results should always be compared to the clinical limb length measurements performed during patient evaluation. After templating for the acetabular and femoral components the vertical distance between the centers of rotation of the acetabular cup and the femoral stem represents the change in limb length that will be obtained. This could be either lengthening (if the femoral component's center of rotation is more proximal than that of the acetabular cup) or shortening of the limb (if the femoral component's center of rotation is more distal than that of the acetabular cup). Similarly, if the center of rotation of the femoral stem lies medially to the center of rotation of the acetabular cup, femoral offset will be increased and vice versa. The distances between the proximal corner of the lesser trochanter and the center of rotation of the femoral head (lesser trochanter center [LTC]), as well as the level of the femoral neck osteotomy are also determined. Intra-operatively, the findings of preoperative templating need to be confirmed. After dislocating the hip. The proximal corner of the lesser trochanter is released and exposed, the centre of the femoral head is determined and the distance between these two points is measured and compared to the LTC distance measured during preoperative templating, to evaluate for accuracy of preoperative measurements. The level of the neck osteotomy is also marked. Once the surgeon has proceeded with neck osteotomy, after reaming and broaching of the femoral canal

and with the final broach in place, a trial femoral neck and a femoral head of the appropriate diameter are inserted. The selection of a neck with a standard or an extended offset depends on the findings of preoperative templating with a general goal of using the midrange of available neck lengths. Moreover, a femoral head with the largest possible diameter accommodated by the acetabular cup is preferable (up to 36 mm), as it is well established that a greater head/neck ratio increases range of motion and stability of the implant.

2) STABILITY

After inserting the selected femoral neck and a +0 head, the LTC distance is determined again. If there is a difference with the LTC measured before the neck osteotomy, then a femoral head of longer or shorter length is inserted. The hip joint is reduced and the surgeon assesses soft tissue tension, range of motion and stability.

Soft tissue tension can be evaluated with three tests: 1) Drop kick test 2) Shuck test 3) Impingement test

1) Drop kick test: When the hip is brought to extension, the knee should remain in flexion. If the knee is extended with this maneuver, then soft tissue tension is too tight.

2) Shuck test: Involves telescopic distraction of the femoral head from the acetabulum, which should only allow for a few millimeters of translation Range of motion is then evaluated and any restriction, particularly in internal or external rotation, is indicative of tight soft tissue tension. The presence of gross instability is also assessed.

3) Impingement test: This is performed by adducting and internally rotating the hip and assessing for hip stability and range of motion before impingement occurs. As noted earlier, if any modifications are deemed necessary after these tests, fine adjustments can be made by using different neck and head offsets and lengths. Once optimal hip biomechanics is achieved, the chosen femoral stem and head are inserted, the

hip is reduced and the surgeon proceeds with closure Careful repair of the posterior capsule with the technique described earlier is critical for enhancing hip stability after total hip arthroplasty.

OPERATIVE PROCEDURE

Surgery will be done under general or spinal anesthesia depending upon the choice of anesthesiologist.

Approach: Posterio-lateral window approach

Incision: 6-8 cms curved incision over posterior one third of greater trochanter. Posterior margin of gluteus medius identified and retracted to develop plane between gluteus medius and piriformis. Short external rotators are exposed by swab dissection and stay sutures passed. Short external rotators released and secured. Capsular exposure done by placing Homan's retractor under gluteus minimus and capsule divided in L shaped fashion. Hips dislocated posteriorly by flexion and external rotation.

Hemiarthroplasty:

Once the head and neck fragment has been removed, the medullary canal of the femur is readily accessible. The canal is rasped with a reselected, appropriately sized broach and trial prosthesis is inserted. The implant's transverse support flange should seat itself on the upper femoral fracture line cortex after only minor bone trimming. Following an acceptable trail fit, the head is re-dislocated and a permanent prosthesis is cemented into femur at proper level. After re-attachment of short rotators to the greater trochanter, the wound is closed over drains in usual manner and post-operative blood loss will be measured in the form of drain output.

Total Hip Replacement:

Approach: Modified Gibson approach

Incision: In this a curved incision was given starting about 10 cm distal to the posterior superior iliac spine, extending

it distally and laterally parallel with the fibers of gluteus maximus till the posterior margin of greater trochanter and then vertically downwards for about 15 cm parallel to the femoral shaft. After dividing the superficial and deep fascia in the line of the incision by blunt dissection, separation of fibers of gluteus maximus was done. The small rotators were cut near their insertions and the capsule incised in T-shaped manner after internally rotating the limb. Hip was dislocated by flexing, adducting, and internally rotating the limb.

PREPARATION OF THE ACETABULAM

The acetabulam was prepared by excising the ligamentum teres and removing the articular cartilage with acetabular reamer till raw cancellous bleeding bone was exposed. Acetabular cavity was packed with a sponge after checking the fitting of the acetabular component.

REPARATION OF FEMRAL NECK

Femoral neck was removed so that only about ¾ inch of calcar femoral remains. The medullary cavity was then reamed using the rectangular chisel and the rasp. Fitting of the trial femoral prosthesis was then done and the medullary cavity was packed with a roll gauge.After changing the gloves, bone cement was mixed with monomer till it becomes doughy. Sponge packing was removed from the acetabular cavity, cement placed and the acetabular cup was pressed over it till the cement was set. Excess of cement was nibbled out. Bone cement was then similarly prepared for the femoral component. The roll gouge pack was removed, and cement was put into the medullary cavity with the help of cement gun, after which the femoral component was hammered in.After the cement was set and excess of cement nibbled away, the femoral component was reduced into the acetabular cup. The movements of the hip joint were then tested and stability noted. The wound was closed in layers after achieving complete homeostasis and putting in a suction drain. The suction drain was removed after 48 hours and post-operative blood has been measured in

the form of drain out-put. Stitches were removed on the 10th or 12th postoperative day and the patient was made to stand and walk using support in the form of crutches or walking frames, 5 days after the operation.

Then patient was discharged from the ward with special instructions to prevent flexion, adduction and internal rotation of hip joint as follows:

1. Not to squat
2. To used English type latrine for defecation
3. Avoid sleeping with affected hip up
4. To keep pillow between the thigh at night
5. Strict use of walker while walking
6. To have an attendant while walking.

Regular quadriceps, hamstring and abduction exercise of hip were advised to keep up the muscle power and movement around the hip joint.

Patients were allowed to continue using walking frames or crutches up to 4 weeks after the operation.

Results were evaluated using Merle'd Aubigne and Postal hip rating system, described by Salvati et al,[77] criteria as below:

Pain:

0 All the time, unbearable, strong medication

2 All the time but bearable, strong medication occasionally.

4 None or little at rest. Pain with activities.

6 When starting, then better; or after a certain activity.

8 Occasional and slight pain.

10 No pain.

(b) Walking:

0 Bed ridden

2 Wheel Chair, transfer activities with walker

4 No Support –house bound

One support –less than one block

Bilateral support less than three blocks

(Markedly restricted)

6 No Support less than one block

One support-up to five blocks

Bilateral support –unrestricted limitedly.

(Moderately restricted)

8 No support-limp

One support – no limp

(Mildly restricted)

10No Support or appreciable limp

(Unrestricted)

(c) Muscle Power and motion

0 Ankylosis with deformity

2 Ankylosis with good functional position

4 Muscle power-poor to fair, are of flexion less than 60°, restricted lateral and rotational movements.

6. Muscle power fair to good, are of flexion up to 90° fair lateral and rotatory movements. (Fair lateral movement: Both abduction and adduction 10° each. Fair rotatory movement: Internal rotation 10° and External rotation 20°)

8 Muscle power good or normal, are of flexion over 90°, good lateral and rotatory movements, (Good lateral movement: 20 each. Good rotatory movement: Internal rotation 20° and

External rotation 40°)

10 Muscle power normal, motion normal or almost normal.

(d) Function

0 Completely dependent and confined.

2 Partially dependent

4 Independent Limited Housework, shops limitedly.

6. Most house work, shops freely, desk type work.

8 Very little restriction can work on feet.

10 Normal activities.

Based upon the sum total of scores of above four evaluations, the results will be assessed as: Excellent : Score 32 or more

Good	:	24 to 31
Fair	:	16 to 23
Poor	:	15 or less

Anesthesia Used

Spinal, epidural, combined spinal and epidural and general anesthesia was used during operation and an average one unit of blood was required in each case with use of cautery.

Period between Operation and Partial Weight Bearing

Partial weight bearing started on 5th post-operative day with walker or crutches.