Direct Anterior Approach - THA

Standard Table Surgical Technique

Pre-Read to Course for Delegates

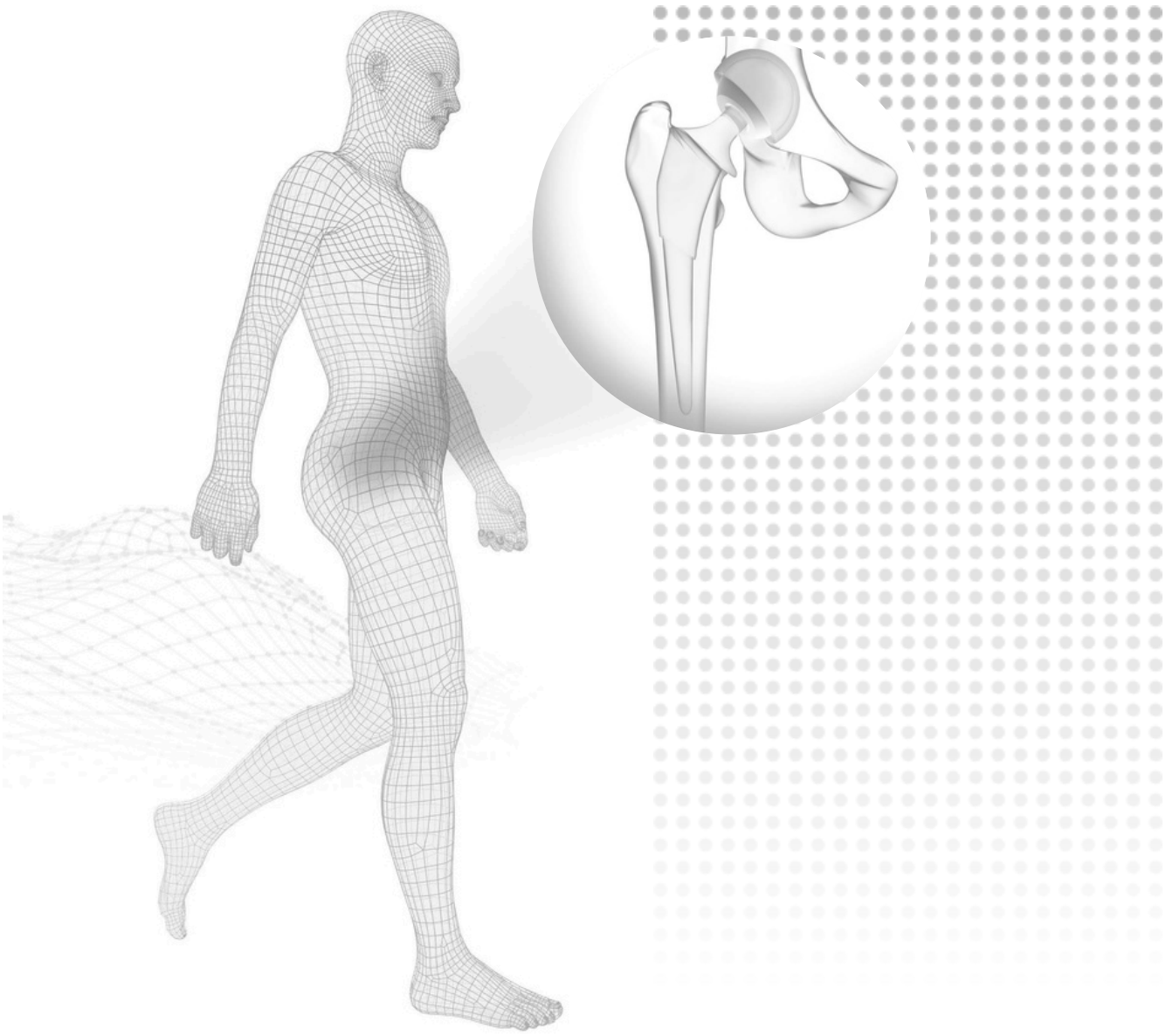

Table of Contents

■ Notes

Glossary and Instrumentation

ASIS – Anterior Superior Iliac Spine

TFL – Tensor Fascia Lata

TAL – Transverse Acetabular Ligament

AP – anterioposterior

Blunt tipped cobra – Matta Narrow Cobra Retractor

Self retaining retractors - Gelpi or Norfolk Norwich

Narrow curved Hohmann – Matta Short Curved Hohmann

Supero-lateral cobra – Matta Narrow Cobra Retractor

90 Degree Hohmann or sharp cobra – Matta Long Hohmann Retractor

Double prong Muller type retractor or single prong cobra – Matta Posterior (Left or Right)

Incision and Initial Exposure

Start the incision approximately 2-3cm distally and 2-3cm lateral to the ASIS and extend distally, slightly oblique and centered over the belly of tensor fascia lata (TFL) muscle. The incision length varies based on body build and commonly ranges from 8 to 14 cm. A reverse oblique, or “bikini” type skin incision can also be used in selected patients. (Image 1)
Palpate the Anterior Superior Iliac Spine (ASIS) under the skin proximally to reconfirm the location of the insertion site of the TFL at the ASIS. The TFL fascia will be incised lateral to the ASIS in line with the TFL fibers (Image 2). Utilize Volkmann’s or Hibbs type retractors to retract the superficial incision edges medially and laterally for visualization of the midsection of the TFL, which can also be identified by the direction of its fiber.

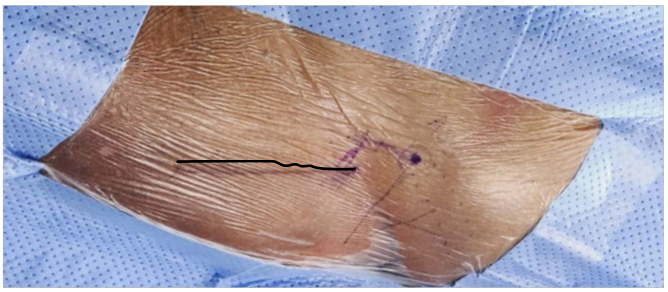

Image 1 View of Left hip. Head on Right, Foot on Left. Dot is ASIS. Incision marked 2cm distal and lateral to ASIS.

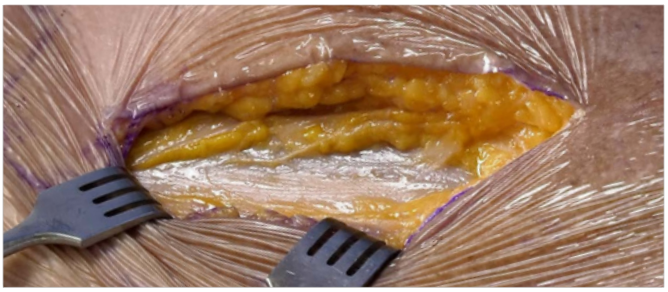

Image 2 View of tensor fascia centrally with superficial fat layers retracted.

Gently sweep adherent fat from the fascia to ensure no crossing branches of the lateral femoral cutaneous nerve are in the anticipated fascial incision. This is typically located between the anterior 1/3 and posterior 1/3 of the tensor muscle. The TFL fascial incision should generally be planned lateral to the incision to help prevent injury to the lateral femoral cutaneous nerve branches. Incise and digitally dissect the fascia of the TFL in the mid portion of the muscle belly, parallel to the fibers. (Image 3)

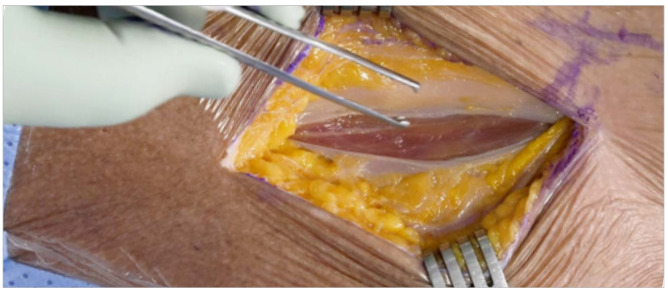

Image 3 View of incised TFL with surrounding superficial fat. Forceps grasp medial edge to help separate fascia from muscle.

■ Note:

Marking the thigh crease may help to avoid going too proximal with the incision, thus helping to both reduce the risk for wound healing complications related to the skin and minimize the risk of injuring the central trunk of the lateral femoral cutaneous nerve as it emerges medially over the iliac crest proximally.

Using an Allis clamp or pickups, lift the anterior medial fascia and dissect around the TFL to mobilize it. Dissect all the way up to its origin on the pelvis, then distally to its insertion of the iliotibial band (IT band). This step loosens the muscle from its fascial attachments, making it more pliable and easier to retract without damaging the TFL. Some patients may have small perforating vessels adherent to the TFL, and these can be cauterized to help mobilize the muscle laterally. (Image 4)

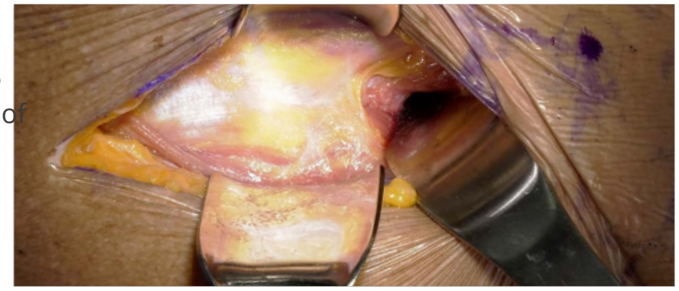

Image 4 Initial view of deep fascia beneath TFL.

Exposure

Place a blunt tipped cobra superior-laterally over the hip capsule, between the gluteus minimus and the hip capsule, retracting the TFL and gluteus minimus supero-laterally. A Richardson or Hibbs type retractor can be useful to retract the rectus femoris medially.
Visualize the lateral circumflex vessels, which are usually located under the posterior fascia of the TFL, about 1cm distal to the edge of lateral cobra retractor. There is a thin layer of fascia overlying these vessels. Carefully split it, then dissect and skeletonize the vessels. They are then clamped, cauterized, and divided. Once this is completed, split the deep vastus fascia longitudinally, which will then reveal the hip capsule proximally and the vastus intermedius distally. Identify and cauterize any additional small perforators.

■ Note:
Self-retaining retractors, such as a deep Gelpi or Norfolk Norwich, can be helpful for these initial steps. Various table-mounted or other self-retaining retractor devices can facilitate surgical exposure and minimize the need for additional assistants for this procedure. (Image 8)

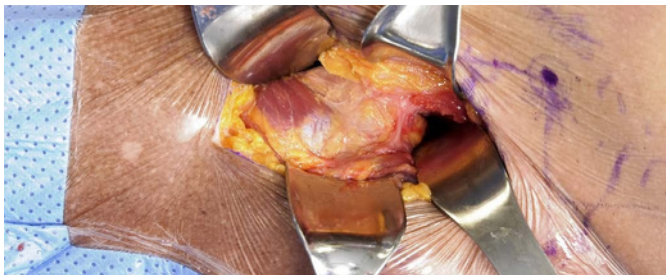

Image 5 Cobra placed around lateral capsule (bottom right of photo). Richardson retractors allow for view of deep investing fascia.

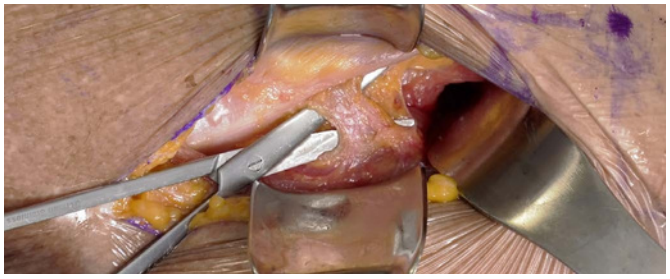

Image 6 LFC vessels are identified and skeletonized for cauterization.

Identify the anterior capsule by using a Key, Cobb, or periosteal elevator and sweep away any peri-capsular fat. Place the tip of a narrow curved Hohmann retractor on the antero-medial hip capsule and retract the rectus femoris and illiocapsularis muscles medially, to expose the anterior capsule.
Optional: The reflected head of the rectus muscle can be released at this time to help further mobilize and retract the direct head of the rectus medially.

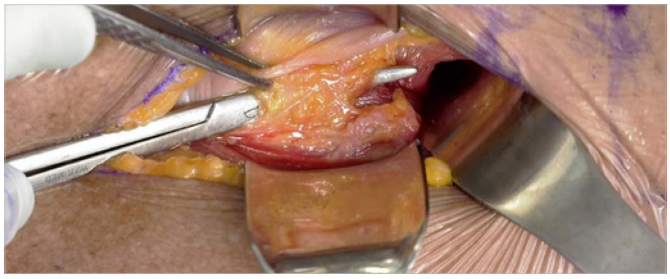

Image 7

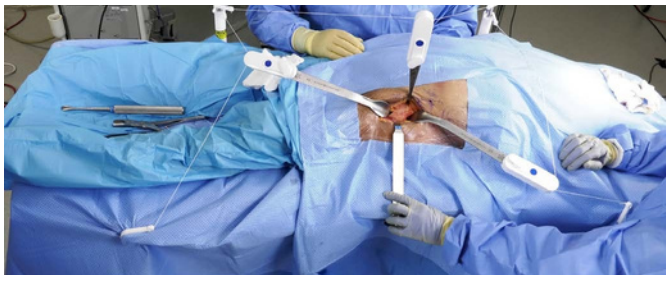

Image 8

Capsular Exposure

The capsule is usually covered with a layer of adipose tissue anteriorly. Gently sweep and debride the tissue over the capsule to expose and delineate the capsular anatomy, which can also simplify repair during closure. Identify and cauterize any anterior capsular perforators, which often exist at the base of the capsule, just proximal to the vastus intermedius.

The capsule, once fully exposed may be opened in an “Inverted T” fashion. Incise the capsule in line with the base of the femoral neck, immediately proximal to the vastus intermedius origin anteriorly (Image 9). Extend this medially around the calcar and laterally to expose the saddle of the femoral neck. Next, the “Inverted T” incision is then completed anteriorly in line with the femoral neck, up to the rim of the acetabulum proximally. Alternatively, the capsular incision may start at the tip of the anterior retractor, follow the acetabular rim distal to the reflected head and commence over the superior neck until the level of the intertrochanteric ridge. Open the capsule medial to the intertrochanteric ridge in the direction of the calcar.

At this point, a capsulotomy can be performed to preserve the capsular limbs. These can either be tagged and reflected for subsequent repair or excised to perform capsulectomy. Tagging the corners of the retained capsular flaps is optional; these tag sutures can be helpful to use as capsular retractors and prevent the capsular limbs from folding into the socket and becoming incarcerated during reduction (Image 10). Reposition the supero-lateral cobra retractor from the original extra-capsular position to an intra-capsular position above the superior neck of the femur, thereby protecting the greater trochanter. Then place a second cobra infero-medially around the neck, thus exposing the femoral neck and protecting these soft tissues and the lesser trochanter (Image 11).

■ Note:

A lap sponge can be placed medially at this time around the femoral neck, both to dry the field and to protect against vascular injury while making the saw cut for the femoral neck osteotomy. Alternatively, if view is difficult, use of a cobra retractor medially can help facilitate view during neck osteotomy.

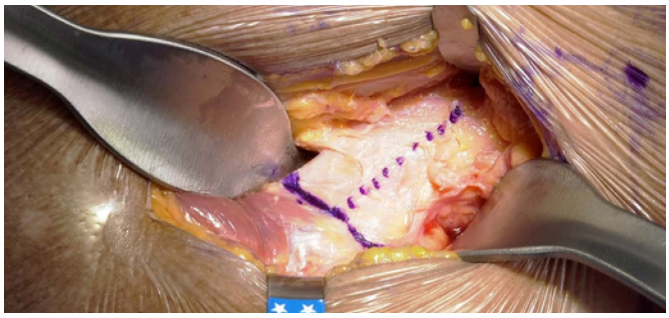

Image 9 Solid Line: Distal Capsule insertion to anterior intertrochanteric line
Dotted line: central split of capsule to complete inverted “T” capsulotomy.

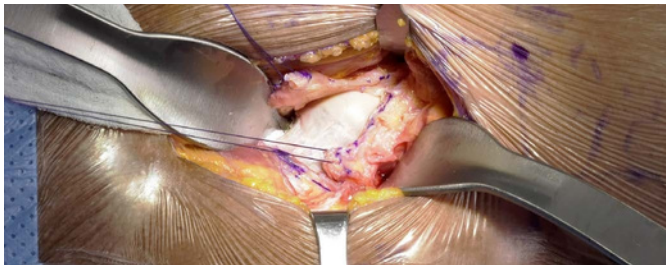

Image 10 Medial capsule has been tagged with suture and Lateral capsule with suture prior to elevation.

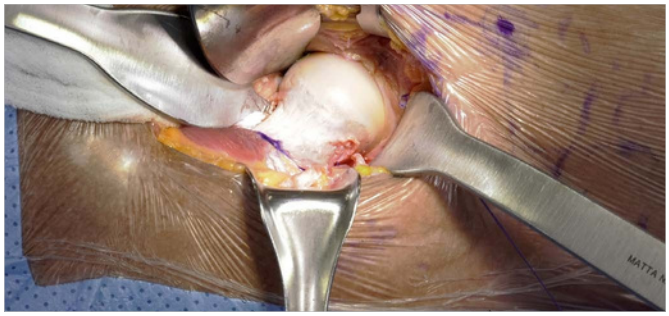

Image 11

To help visualize and release the remaining attached medial capsule, place the patient's leg in a frog leg or "figure of four" position. It is vital that the capsule is released properly to ensure that there are no complications later in the procedure. Proper release of the capsule is key to having proper visibility and access to the femur.
The capsular release should include the pubofemoral ligament, which allows for palpation of the lesser trochanter. Complete this release after the femoral neck osteotomy and removal. If needed, adjust femoral neck cut according to the pre-operative plan to help facilitate acetabular exposure.

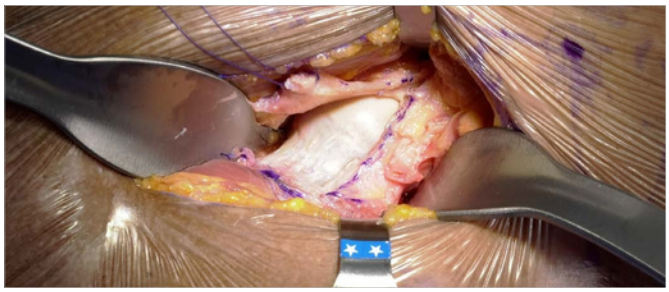

Image 12 Medial cobra moved to intra-capsular position to improve exposure and protection of femoral neck.

■ Note:
If you're having problems exposing the neck, make sure your capsular exposure extends proximal enough to expose the acetabular rim, and distal enough to see and feel the base of the lesser trochanter, which can typically be felt after the neck osteotomy and the subsequent release of the pubo-femoral ligament.

■ Note:
Early in the learning curve, the main difficulty is mobilization of the femur. Some surgeons recommend excising the anterior capsule to improve intra-articular visualization, which may also help with a deep exposure in a large patient.

Femoral Head Resection (In-Situ)

In preparation for the femoral head resection, bring the leg to a neutral position.
Plan the neck cut at this stage. Identify the “saddle,” which is the most lateral aspect of the femoral neck where it meets the greater trochanter, also which is the point of one end of the femoral osteotomy. The inter-trochanteric ridge is palpated. The neck cut should remain approximately 5mm proximal to the inter-trochanteric ridge (Image 13). Using this landmark, mark out your planned neck cut using a femoral neck cutting guide and the electrocautery device, aiming medially and inferiorly to the region above the lesser trochanter (approximately 45 degrees to the axis of the femur). Avoid making too vertical of a neck cut at this time (Image 15).
Removal of the femoral neck can be done as a single cut or as a “napkin ring” technique. If planning a napkin ring cut, mark out a parallel line superior to your pre-op templated neck cut, in the sub-capital area, with at least 1.5cm between these two cuts (Image 14).
This will more easily allow removal of the “napkin ring” neck segment, using a Cobb or an osteotome (Image 16). Locate and remove the anterior labrum to visualize the bony rim of the acetabulum. The labrum is often ossified (acetabular osteophyte) and can be excised with an osteotome or Rongeur.

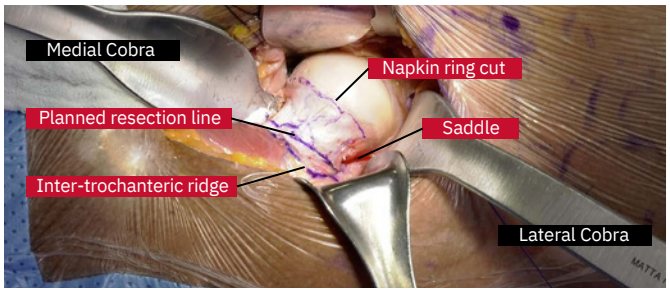

Image 13 Femoral neck exposure. Richardson retractor helps reveal saddle of left femoral neck. Lateral cobra over labrum.

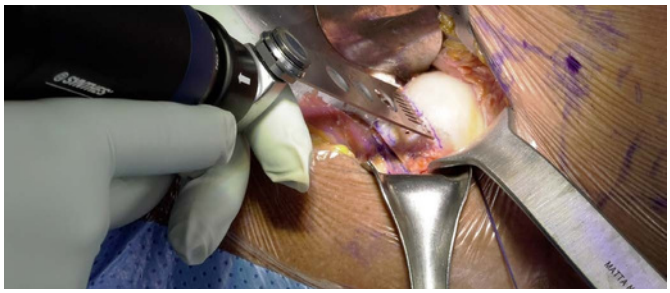

Image 14

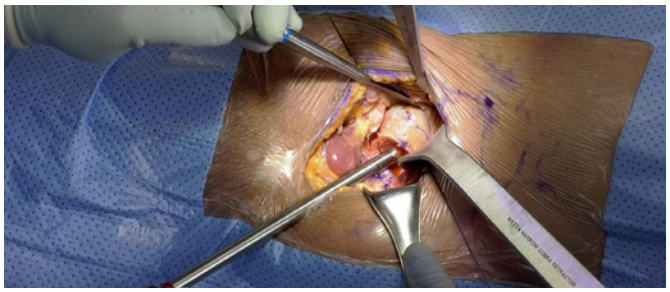

Image 15

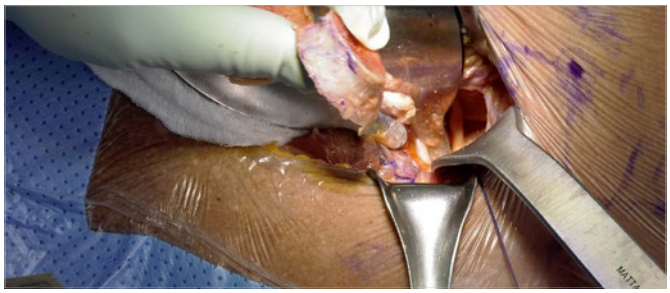

Image 16

■ Note:
Fluoroscopy may be used to verify the proper neck cut location by utilizing a femoral neck cut guide. If the neck cut is too high, exposure and reaming of the acetabulum can be difficult (Image 17).

If you're using a single neck cut and the femoral head cannot be removed, at this point a second cut can be made more proximally on the neck and the ring of the bone should be moved with a Kocher.

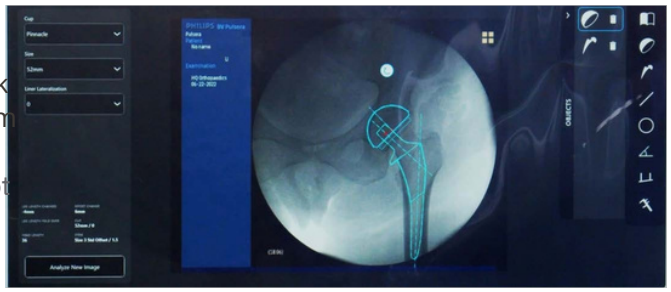

Image 17

■ Note:
If there is a large anterior acetabular osteophyte, remove this prior to neck cut, and femoral head removal to improve ease of femoral head dislocation.

■ Note:
Internally rotate the operative leg approximately 10 degrees to lateralize the greater trochanter to avoid creating an iatrogenic greater trochanter fracture during the lateral portion of the neck cut.

Drive a power Corkscrew or a T-handle Corkscrew through the femoral neck or anterior cortex into the center of the femoral head. Attach the Excel T-handle to the power corkscrew attachment.

Spin the femoral head clockwise to keep the Corkscrew threads engaged to engage the head, then manually subluxate the femoral head and use an electrocautery to carefully release the ligamentum teres from the head, to avoid traumatic avulsion. Remove the femoral head taking care not to damage the tensor with the sharp edge on the femoral head from the neck cut.

■ Note:
Externally rotate leg to 90 degrees to open the osteotomy to help remove femoral head.

Femoral Exposure

Return the operative leg to the figure-of-four position. Full external rotation will expose the medial femoral neck and allow the release of the medial capsule, inferiorly, as before. Using an electrocautery, dissect along the medial neck to expose the base of the lesser trochanter, completing the capsular release inferiorly. This is critical for femoral mobilization to achieve both acetabular and femoral component exposure.

■ Note:

The psoas tendon will not be released from the lesser trochanter if only the base of the lesser trochanter is cleared of capsular attachments.

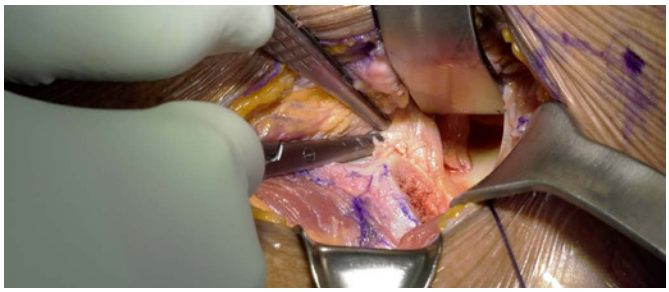

Image 18

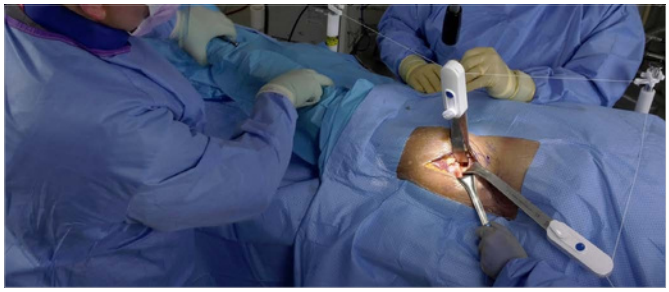

Image 19

■ Note:

Release the pubo-femoral ligament from the inside-out of intra-articular direction to minimize the risk of damaging vessels of the proximal femoral neuro-vascular bundle. These vessels run approximately 1cm distal to the lesser trochanter

The superior capsule is released prior to acetabular exposure to facilitate femoral mobilization.

Acetabular Exposure and Reaming

Return the operative leg to neutral position.
Place a 90 degree Hohmann or sharp cobra on the anterior lip of the acetabulum, inside the capsule, but outside the labrum and anterior wall, to initiate exposure.
Place a bent Hohmann or a sharp cobra on the posterior lateral lip of the acetabulum. This can help to expose and preserve the Transverse Acetabular Ligament (TAL), which can serve as a useful anatomic landmark for cup positioning.
Place a double prong, Muller type retractor, or another single prong cobra, under the posterior lip of the acetabulum, inside the posterior capsule, but outside the posterior labrum and wall. This will retract and protect the external rotators posteriorly while also depressing the cut face of the femur laterally and posteriorly.
Place a sharp tipped retractor at the level of the ischium which is at the level of the posterior insertion site of the TAL. This will retract the postero-inferior capsule.
With these three retractors in place, a 360-degree view of the acetabulum and the TAL is achieved.

■ Note:
In case the calcar jeopardizes the acetabular exposure, the neck cut is too high and should be redone prior to acetabular reaming.

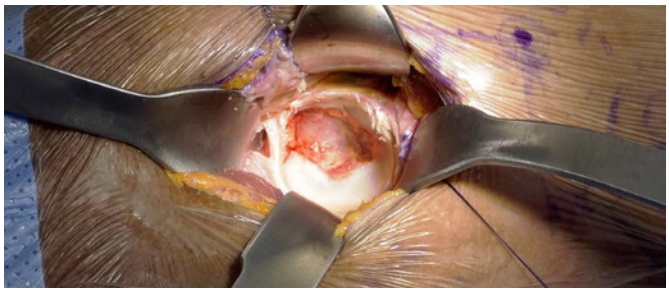

Image 20

Matta Long Hohmann Retractor

Matta Narrow Cobra Retractor

Next, excise all residual labrum, peripheral osteophytes, ligamentum teres, and pulvinar. Be mindful of the branch of the obturator artery that is often encountered when removing the teres and pulvinar tissue.
The patient should be positioned with the legs in neutral position and the operative leg slightly externally rotated to maximize exposure for acetabular reaming. This is most often achieved automatically when the retractors are in the correct position. (Image 20)

Begin reaming the acetabulum in line with the native cup position and desired final cup position, by aiming the reamer slightly anterior to posterior, and proximal. Medialize with the reamer aimed medial and slightly posterior and superior. Be sure to maintain a direct view of the rims and TAL during the steps of acetabular preparation to ensure accuracy. (Image 21)

Be careful not to ream out the anterior and posterior walls, as leverage on the reamer handle by tight posterior or lateral soft tissues can inadvertently force the reamer head anteriorly and may compromise the posterior column.

■ Note:

A cup that is too large may lack purchase and an overhang anterior edge may impinge on the illiopsoas tendon.

Either straight or offset reamer handles can be used through this approach, depending on surgeon preference. Sequentially ream in 1-2 mm increments, paying attention to reamer orientation, depth of reaming, wall thickness, and overall fit of each reamer (Image 22, Image 23). Look for and control bleeding near the inferior cotyloid notch or obturator foramen. Before reaming to the final templated size, it is possible and recommended that the reamer position be checked with fluoroscopy (Image 24). Rotate the C-arm image (A/P) view on the screen until the pelvis image appears level when the transverse anatomic line is horizontal. With the image centered over the midline, the coccyx should be pointing right at the symphysis, and the obturator foramina should look symmetrical. You may need to orbit and rainbow the C-arm, or alternatively tilt the bed, to accomplish this. In larger patients, the incision may need to be extended distally if a straight handle is used.

After leveling the image and pelvis, center the image over the operative acetabulum. The image of the reamer shows where the Cup will be centered. Generally, the Cup should be placed at the patient's anatomic center of rotation. The Cup should have a good circumferential fit. Refer to VELYS™ Hip Navigation User Guide.

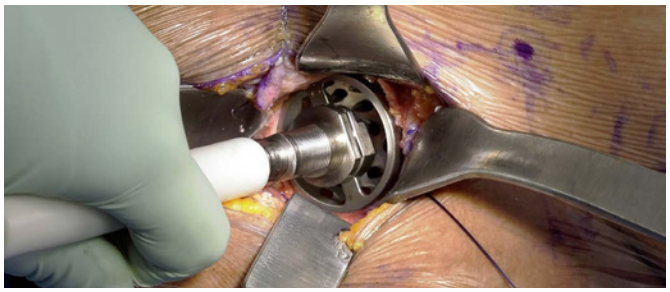

Image 21

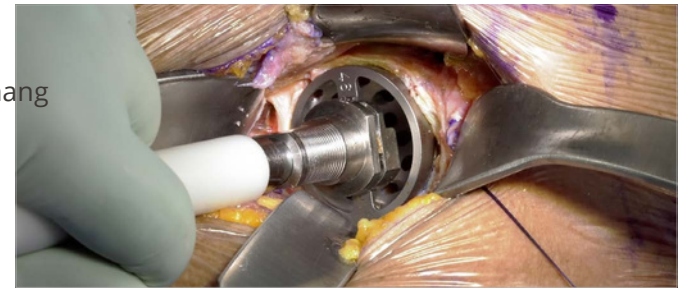

Image 22

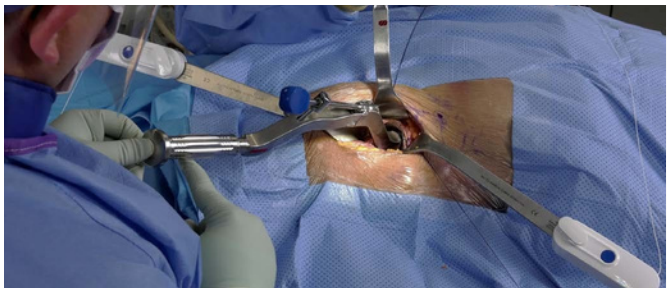

Image 23

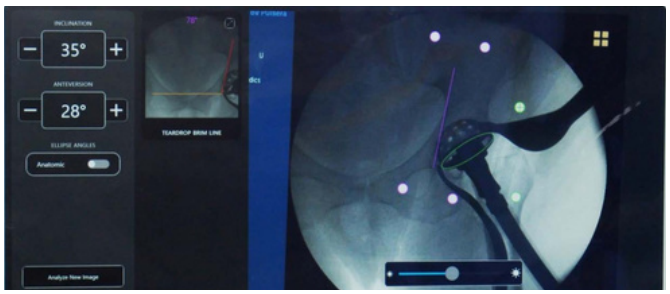

Image 24

A trial Cup may be used to verify fit and seating (Image 25, Image 26). Make sure the peripheral soft tissues do not fold in as the Cup is being placed, especially the capsular limbs. Start to seat the Cup, then remove the retractors and bring in fluoroscopy for verification of anteversion and abduction angle.
On the fluoroscopy screen, the surgeon must be able to visualize the symphysis pubis to ascertain a proper horizontal pelvis and to properly abduct the Cup angle (Image 27). Once the pelvis position is confirmed to be similar to the pre op film, an AP hip image should be taken. The use of VELYS™ Hip Navigation can be useful at this step, to confirm the inclination and version angles of the reamer prior to trialing and cup insertion. (Refer to VELYS Hip Navigation User Guide)
When you have reamed to the appropriate size you can insert the trial or Cup (trial liner optional) (Image 28). After confirming alignment and position of the trial, remove it carefully and then insert the final prosthesis.
For surgeons unaccustomed to the supine position used for the anterior approach, it is common to place the cup with too much inclination and anteversion. The correct insertion orientation is typically more parallel to the floor and the long access of the body than expected. Use the direction of the TAL as a reference line for socket anteversion. Remain parallel to the TAL.
Manually check for proper placement of the final component with the insertion handle, then confirm with the C arm and VELYS Hip Navigation as appropriate. Aim for 40 to 45 degrees of inclination and 20 to 25 degrees of anteversion, based on patients' anatomy. The TAL can also be used as a check at this step, as it can serve as an anatomic guide for confirming correct anteversion and abduction.

■ Note:

In the majority of patients, the final reamer should not extend distal to the base of the teardrop (inferior cotyloid notch), as this is often associated with an oversized cup.

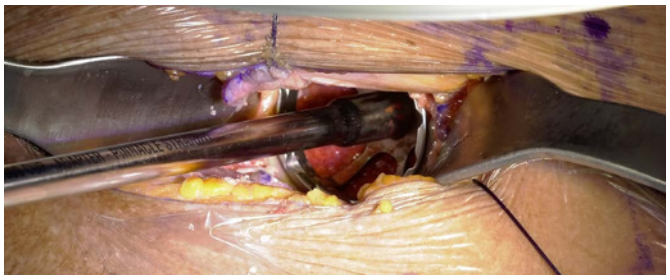

Image 25

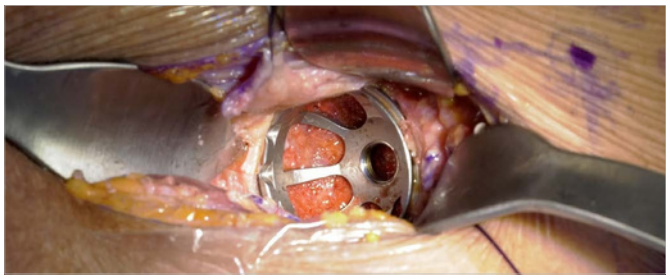

Image 26

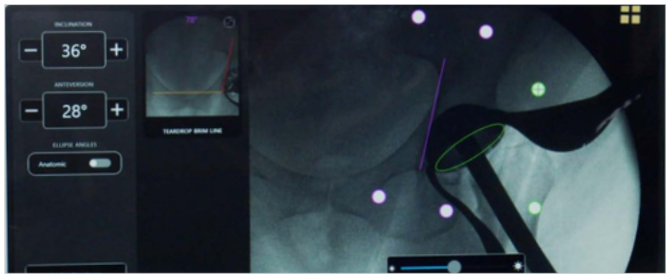

Image 27

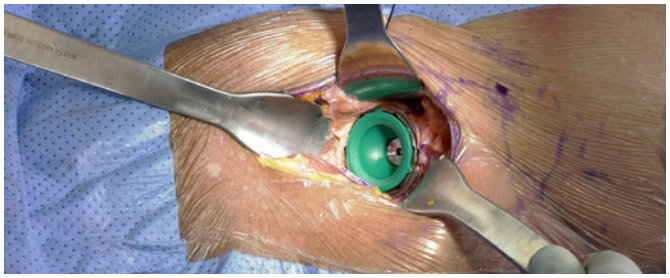

Image 28

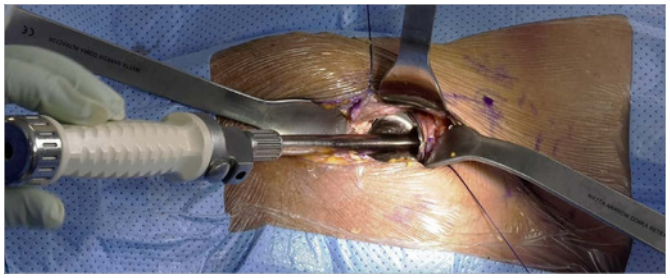

Image 29

The angle and proportions of the image of the ellipse of the rim of the Cup indicates inclination and anteversion. Place the final component into position and impact the Cup utilizing manual impaction or KINCISE™ Surgical Automated System. Before inserting the Cup liner, replace the acetabular retractors and dry the inner taper junction of the shell. Next insert the liner into the cup, manually seating it into the cup. Once seated, use the poly impactor to press the liner into position, then impact it and perform a final check of liner seating as well as final cup position with fluoroscopy. ■ **Note:**
The height of the neck cut can be verified on this final acetabular image as well, which can inform where the broach should be seated during subsequent femoral preparation.

Femoral Preparation

Prior to placing the operative leg in a lazy figure-of-four position with either the operative leg behind the non-operative leg or placing it on the arm-board at the foot of the bed, the superior femoral release may be needed with the leg in neutral position. This will apply less pressure to the proximal femur. Do not over flex the knee, as this tightens the rectus and makes mobilization of the femur more difficult.

■ Note:
An arm board placed on the non-operative side can help abduct the contralateral leg and support the foot & ankle. This also serves to assist in achieving adduction and external rotation of the operative leg during femoral preparation.

■ Note:
If using a Mayo, place the non-operative leg up on to the Mayo stand to prevent hyperextension.

■ Note:
The goal is to allow the posterior edge of the trochanter to lateralize and avoid getting locked behind the acetabulum. Aim to position the leg in a figure-of-four position, flexing the knee as little as possible.

The femoral exposure is facilitated with the following sequential maneuvers. First, pull the femur anterior and lateral to pull the tip of the greater trochanter away from the posterior acetabular rim. This is done with a bone hook in the osteotomized neck at the level of the calcar. The leg is in neutral rotation. Second a double prong trochanter retractor is put between the gluteus minimus and the bold spot of the lateral part of the greater trochanter. The retractor is then pushed in the posterior direction pushing away TFL and the minimus. This maneuver keeps the femur elevated anteriorly to these muscles (Image 31). Third, the contralateral leg is lifted, and the ipsilateral leg is adducted in a lazy figure of four position underneath the contralateral leg. The ipsilateral foot is put on top of the contralateral arm board. Fourth, place a cobra or Muller retractor medially on the posterior neck of the femur. This helps to lateralize the proximal femur for preparation and provides visualization of the calcar throughout the preparation process.

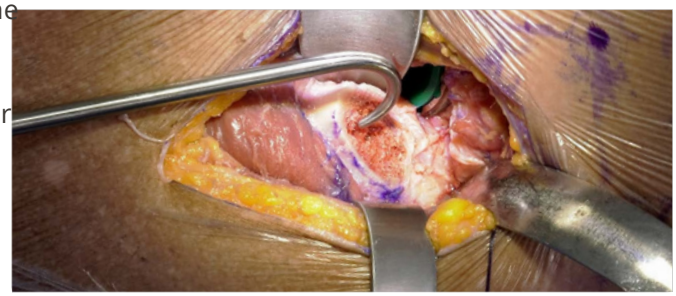

Image 30

Image 31

Place a blunt bone hook into the cut edge of the femoral neck calcar or around the posterior femur (in osteoporotic patients) and direct the assistant to provide gentle lateral traction to the femur. With sequential soft tissue release of the lateral and posterior capsule, the femur can be pulled laterally, thus preventing the tip of the greater trochanter from being caught behind the posterior edge of the acetabulum.

The lateral capsule can obstruct the view of the medial aspect of the greater trochanter and the insertion of the external rotators. The lateral capsule, once released from the minimus and femoral insertion, can tuck into the acetabulum, allowing an unobstructed view of the medial aspect of the greater trochanter. Continue this dissection posteriorly, directly exposing the bone of the medial side of the greater trochanter.

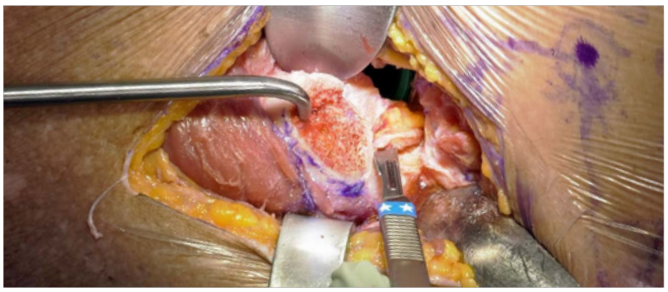

Image 32 Postero-lateral capsular release performed in the “11 O’Clock” position.

■ Note:

This soft tissue release is sequential and must be continued further posteriorly and inferiorly where the hip has a contracture.

■ Note:

Extending the release of the superior capsule beyond the posterior cortex of the femoral neck may jeopardize the insertion of the obturator externus and the piriformis.

■ Note:

If lateral capsule release and femoral mobilization are not adequate, there is a possibility of inserting the stem in a varus position or undersized stem. Once the lateral capsule has been released, sequential releases of the obturator internus and possibly piriformis tendons can be performed as necessary to allow elevation of the femur. A release of the obturator externus is rarely necessary and should be avoided.

Once the soft tissues have been adequately released, the femur can be pulled anteriorly, allowing direct visualization of the femoral canal for broaching.

■ Note:
the medial edge of the TFL is a distinct thin white fascia. To aide in preparation of tight, muscular hips, this tendinous portion of the TFL can be partially released from its proximal origin off the iliac crest.

Elevate the femur using the bone hook to pull the femur laterally, then anteriorly. Place the Single or Double Curved Hohmann retractor lateral to the tip of the greater trochanter, maintaining its lateral and anterior position. Adduct, extend, and externally rotate the leg. Be careful not to lever rigorously off the TFL muscle as it can be damaged.

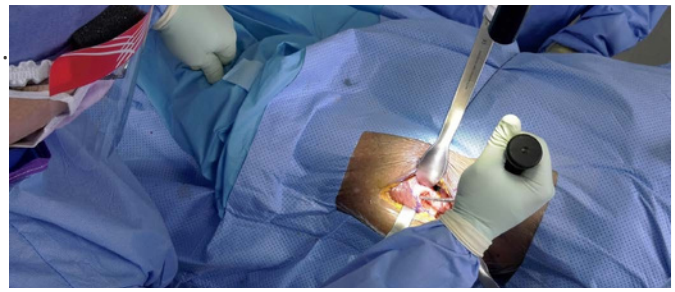

Image 33

■ Note:
in contracted hips, the entire posterior capsule may need to be released as it is contracted from the external rotation position of the hip. Additional Trendelenburg and hip extension can be utilized as needed. More adduction and external rotation can be applied to the knee/thigh by the 1st assistant to gain exposure for broaching.

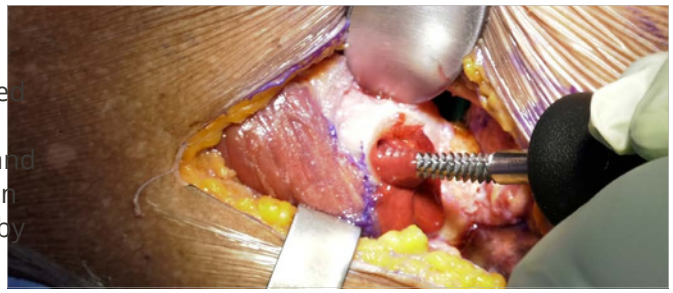

Image 34

■ Note:
If needed, lower the leg portion of the table approximately 30 degrees to hyperextend the operative hip. Lift the contralateral leg, and place the operative leg underneath in the adducted, extended, figure-of-four position. The operative leg/ankle should be resting on the arm board.

Assess femoral stem version using posterior cortex of the cut surface of the femoral neck and by palpation of the medial epicondyle. Optionally, you can flex the knee 90 degrees temporarily and look at the tibia to guide version.

Initiate femoral canal access using a blunt canal finder to find the correct axis and assess if you have adequate exposure prior to broaching. Verify with the suction tip that you are within the canal before broaching. Use a box osteotome to remove the lateral neck remnant if necessary (Image 33, Image 35).

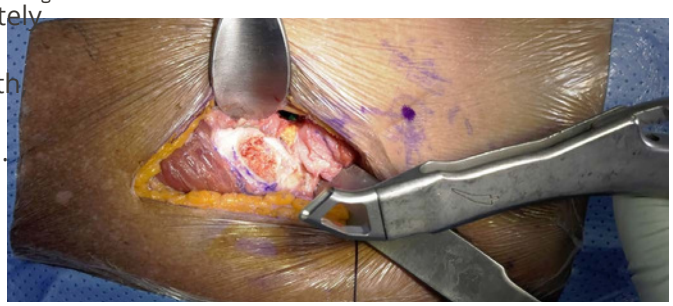

Image 35

Also note the direction of the femoral canal for broaching. Avoid the tendency to direct the tip of the broach posteriorly, which can lead to undersized/varus stem and possibly fracture.

Femoral Broaching

Begin with the starter broach to clear bone laterally. While taking care to maintain proper alignment and version, sequentially advanced the broaches down the femoral canal with either the conventional mallet or KINCISE Automated Surgical System (Images 36, 37, 38, 39) Continue to increase broach size up to templated size. When rotational and axial stability are achieved and the broach is at a seating level that recreates proper leg length, this should be the final size. The direction of broach handle should be parallel to the femoral canal and pointed to the knee. This tip could help to avoid varus broach, calcar fracture, and canal perforation.

■ Note:

A ronguer may be used to remove the most lateral extent of the femoral neck at the trochanteric saddle. This hard bone is removed because it tends to drive the broach into varus position.

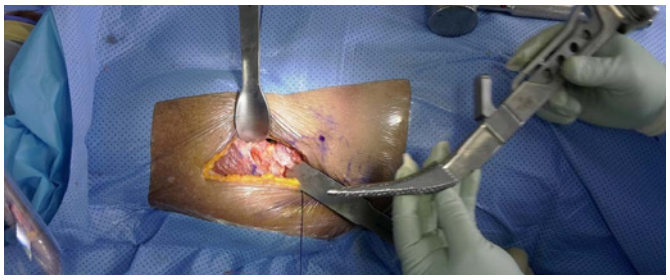

Image 36 Matta AA Broach Handle

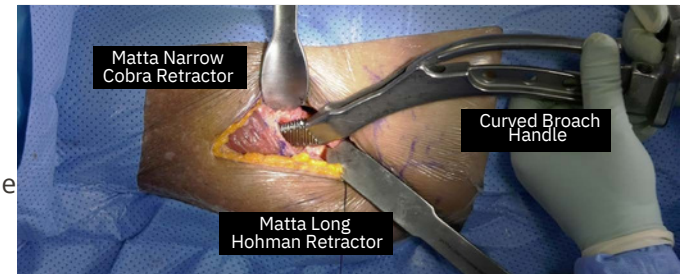

Image 37 Single Offset Curved Broach Handle

It is not recommended to rotate the broach in the anterior and posterior planes until it is time for the final rotation stability check, as rotating the broach prematurely can create open spaces between the final stem and the cancellous bone on the anterior and posterior sides.

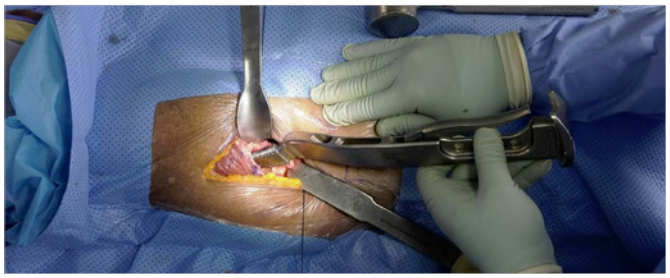

Image 38 Dual Offset Broach Handle

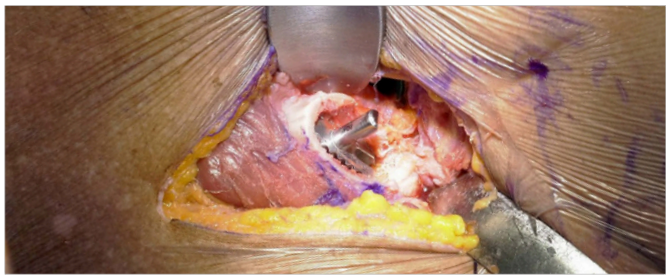

Image 39 Final broach in place with prominent posterior femoral neck prior to planing

Femoral Trialing

Place a trial head and neck on the broach and perform trial reduction (Image 40). If desired, two heavy sutures can be tied through the dome holes of the trial femoral head to prevent and retrieve the intra-pelvic trial head should unanticipated separation and migration during the reduction and dislocation steps.
Return the table to the level position with the legs parallel with the floor.
To reduce the hip, use one finger or a head pusher to maintain the trial head and neck on to the broach, and then tension and reflect the capsular flaps out of the way as the head is reduced. (Image 41, Image 42)
To test for posterior and anterior stability: anterior stability checked by external rotation in extension, posterior stability checked with hip flexion to 90 degrees and internal rotation. The surgeon should also check for impingement of the neck on the acetabular rim from any overlooked or retained bone spurs, especially in the posterior acetabulum and femur, as these may lead to anterior dislocation.
At this time, take the leg through a dynamic, full range of motion, to also ensure no contact occurs between the prosthetic neck and around the rim of the acetabular cup.
Next, check leg lengths at the feet as both feet are accessible. Excessive force needed to reduce or dislocate the hip construct typically means excessive leg length or offset.
Check the leg length and offset with the X Ray (Image 43). Position the hips identically to get accurate comparison views. Take an X Ray of the nonoperative hip to be used as a control. Then take a picture of the operative hip for comparison.
At this time, the surgeon can use Fluoroscopy to print out the operative hip picture as an acetate and overlay with a preoperative x-ray then compare with the preoperative plan. A lateral image should also be obtained, which further helps to confirm stem direction, sizing, and identify any possible stem perforation.

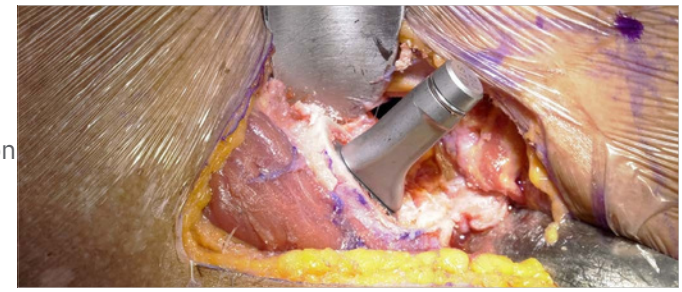

Image 40

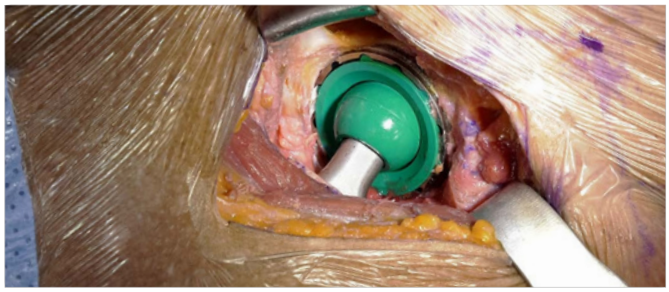

Image 41

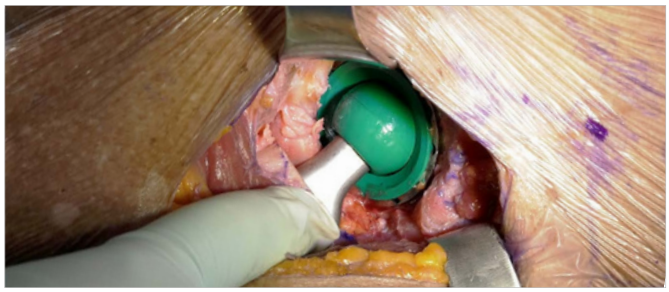

Image 42

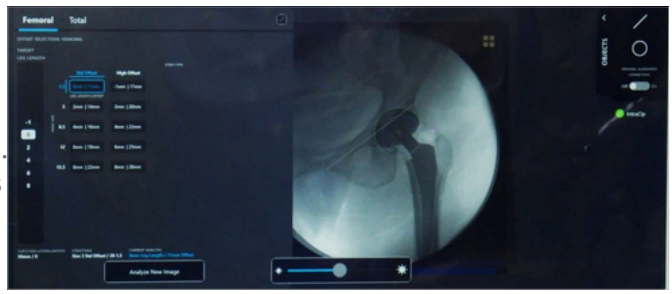

Image 43

■ Note:
Use of the VELYS Hip Navigation can also help provide digital overlay and assessment, for more accurate calculation of anteversion, abduction, leg length, and offset.

Dislocate the hip then sequentially replace the same retractors to re-establish femoral exposure. If the trial reduction was satisfactory, with good broach size and position, and accurate leg length and offset, then remove the trial neck and plane the calcar if necessary. Place the MI calcar planer on to the broach trunnion and mill the calcar flush to the broach face. Make certain the calcar planer is rotating before engaging the calcar to prevent the planer from binding on the calcar and potentially causing a fracture. Special attention should be given to the direction of the calcar planer to make sure it is axial and not rotating on the axis of the broach trunnion.

If during trial reduction, it was determined that adjustments were needed, make the necessary adjustments to correct broach size, insertion depth, neck length, or offset. Significant adjustments should generally be re-checked with another trial reduction and re-assessment with dynamic range of motion.

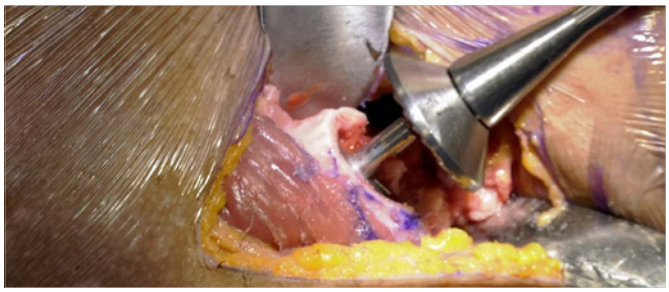

Image 44

Final Implantation

Once satisfied with the planned construct, remove the broach trial, irrigate, and then select and implant the final stem.

Select the stem size that corresponds to the final broach. In the medial and lateral areas, the implant is oversized by .25 millimeters per side relative to the broach. Introduce the implant into the femoral canal by hand as far as possible before engagement with the stem inserter. Take care to orient the implant with proper alignment and version.

The stem should be impacted with light blows until it is seated using the curved anterior inserter. Final impaction can be accomplished with the impaction handle to ensure the calcar collar seats flush on the prepared calcar, in case of using the ACTIS™ or CORAIL™ Collared Stem.

Using the moderate mallet blows advance the stem into position. The implant is fully seated when the top of the gription coating reaches the same level where the face of the broach previously sat, and the implant is stable.

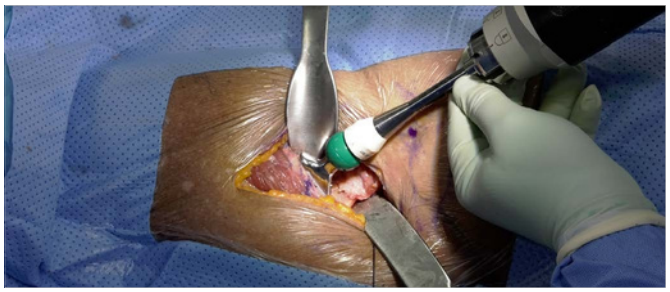

Image 45 Use of KINCISE impaction technique to seat femoral head (trial head demonstrated in photo).

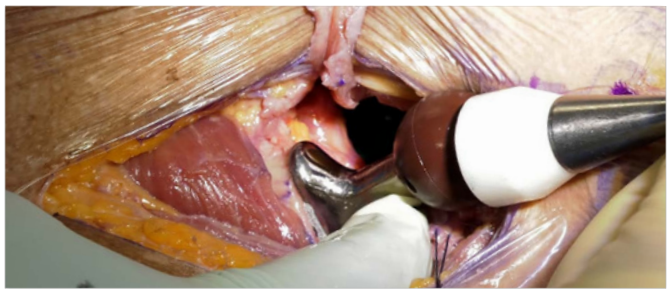

Image 46

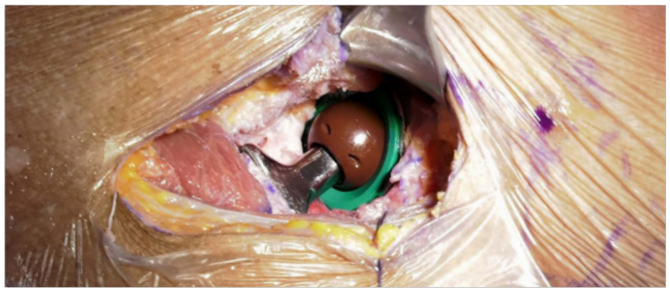

Image 47

Excessive force should not be needed to seat the stem. If difficulty is encountered during final stem seating, remove the stem, and re-broach with one size below the final selection. Replace the final implant and ensure lateral pressure is applied to maintain a valgus orientation during impaction.
Lastly, the surgeon can re-trial the construct with a trial femoral head. Once satisfied with the final construct, dislocate the trial head, wash and dry the stem trunnion meticulously, and place the final head onto the stem and impact, followed by one reduction. (Image 48)
To close the case, irrigate copiously, and maintain meticulous peri-articular hemostasis. Repair the anterior capsule with sutures if a Capsulotomy was performed. Take a final X Ray and perform final wound closure.

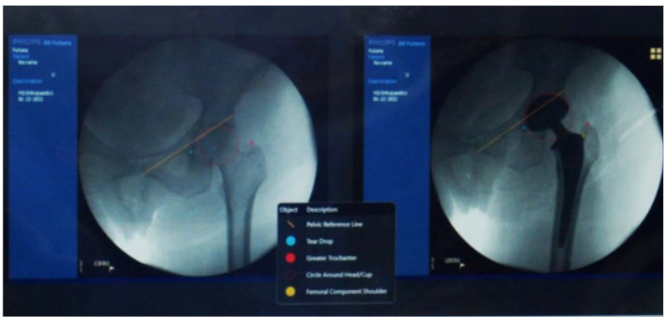

Image 48

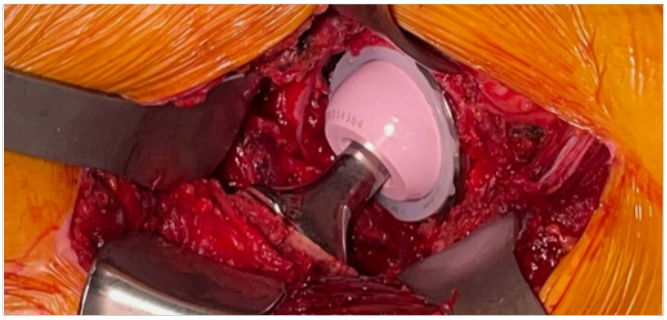

Image 49

Excessive force should not be needed to seat the stem. If difficulty is encountered during final stem seating, remove the stem, and re-broach with one size below the final selection. Replace the final implant and ensure lateral pressure is applied to maintain a valgus orientation during impaction.
Lastly, the surgeon can re-trial the construct with a trial femoral head. Once satisfied with the final construct, dislocate the trial head, wash and dry the stem trunnion meticulously, and place the final head onto the stem and impact, followed by one reduction. (Image 48)
To close the case, irrigate copiously, and maintain meticulous peri-articular hemostasis. Repair the anterior capsule with sutures if a Capsulotomy was performed. Take a final X Ray and perform final wound closure.

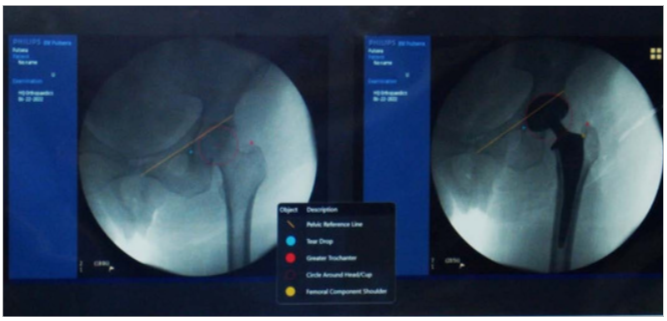

Image 48

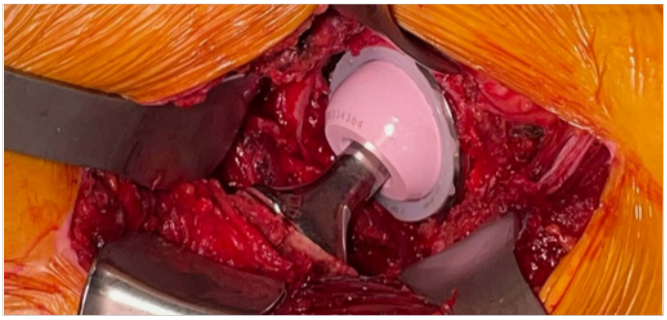

Image 49

Course Objectives:

Upon completion of the IAHF Course, participants will be able to:

- Define the anatomy and exposure relevant to the Direct Anterior Approach (DAA) and its implications
- Explain the differences in orientation between Posterior and Anterior Approaches to the Hip
- Understand patient selection criteria for the first 50 cases of DAA
- Describe the stepwise capsular releases required for femoral preparation
- Manage basic intra-operative challenges during the first 50 cases of DAA

These objectives are designed to equip participants with the knowledge and skills necessary to confidently perform DAA hip replacements.