

# AnteriorPath<sup>®</sup>

PORTAL ASSISTED ANTERIOR HIP APPROACH

Surgical Technique

# ANTERIOR PATH APPROACH

## Indications and Warnings

### General risks

Please consult product package insert for additional risk information, this can be found under Prescribing Information on [ortho.microport.com](http://ortho.microport.com), and then selecting any brand of MicroPort hip implants. Please consult the product package insert for information on cleaning and handling of MicroPort instruments, this can be found under Prescribing Information on [ortho.microport.com](http://ortho.microport.com), and then selecting "Cleaning and Handling of MicroPort Instruments."

Inspect instruments **prior to use** for items that may cause unacceptable functional deterioration that exceeds the instrument's use life:

1. damage during shipment or storage;
2. visual cues such as worn surfaces, dull edges, corrosion, pitting, cracking, or discoloration; and,
3. difficulty to move, lock, or mate pieces.

### Indications

#### Intended Use

MicroPort® total hip systems are intended for use in total hip arthroplasty for reduction or relief of pain and/or improved hip function in skeletally mature patients.

**Please consult the package insert Instructions for Use for information regarding a specific MicroPort implant.**

#### Indications for Use

1. non-inflammatory degenerative joint disease such as osteoarthritis, avascular necrosis, ankylosis, protrusio acetabuli, and painful hip dysplasia;
2. inflammatory degenerative joint disease such as rheumatoid arthritis;
3. correction of functional deformity; and,
4. revision procedures where other treatments or devices have failed

Rough grit blast surfaces and the hydroxyapatite and titanium plasma spray coatings applied to implant surfaces are intended for uncemented arthroplasty.

Hemi Unipolar Head is indicated for use in hemiarthroplasty for reduction or relief of pain and/or improved hip function in skeletally mature patients, for replacement of the femoral head of the hip joint due to degenerative bone disease, trauma, non-union, or avascular necrosis.

Bipolar Hip System is indicated for the following conditions:

1. Pathological fractures of the femoral neck;
2. Non-union of femoral neck fractures;
3. Aseptic necrosis of the femoral head and neck; and,
4. Primary pathology in the young involving the femoral head but with a non deformed acetabulum.

**Please consult the package insert Instructions for Use for information regarding a specific MicroPort implant.**

### Important

Proper surgical procedures and techniques are the responsibility of the medical professional. The following guidelines are furnished for information purposes only. Each surgeon must evaluate the appropriateness of the procedures based on his or her personal medical training, experience, and patient condition.

Prior to use of the system, the surgeon should refer to the product package insert for additional warnings, precautions, indications, contraindications and adverse effects.

Instructions for Use package inserts are also available by contacting the manufacturer. Contact information can be found on the back of this surgical technique and the package insert is available on the website listed.

**Package inserts can be found under:  
Prescribing Information on [ortho.microport.com/ifus](http://ortho.microport.com/ifus)**

Please contact your local MicroPort Orthopedics representative for product availability.

# Table of contents

INDICATIONS AND WARNINGS	<b>1</b>	Indications and Warnings
INTRODUCTION	<b>3</b>	
SURGICAL TECHNIQUE	<b>3</b>	Patient selection
	<b>3</b>	Preoperative planning
	<b>3</b>	Patient orientation
	<b>4</b>	Incision
	<b>4</b>	Superficial dissection
	<b>5</b>	Capsular exposure
	<b>5</b>	Capsulotomy/Capsulectomy
	<b>6</b>	Osteotomy
	<b>7</b>	Portal assisted acetabular preparation
	<b>8</b>	Position of the leg during cannula placement
	<b>8</b>	Acetabular reaming
	<b>9</b>	Cup placement
	<b>9</b>	Screw placement
	<b>9</b>	Liner placement (trial or implant)
	<b>10</b>	Femoral exposure
	<b>11</b>	Femoral preparation
	<b>12</b>	Stem Insertion
	<b>12</b>	Closure
	<b>12</b>	Revisions
	<b>12</b>	Postoperative care
	<b>12</b>	Retractor options

# Introduction

The Anterior Path® Approach for total hip arthroplasty is a portal-assisted surgery designed to emphasize direct visualization and access to both femoral and acetabular preparation, when compared to other more traditional approaches (Posterior, Posterolateral, Anterolateral).

The canula allows for a combination of inline reaming and impacting while doing so under direct visualization. As with precursor portal techniques, the tissue sparing

nature of the surgery dictates the lack of the need for typical range-of-motion restrictions.

Component positioning can potentially be optimized with the aid of intraoperative fluoroscopy, which is facilitated by the supine positioning of the patient.

Anterior Path® was developed to be used with all MicroPort Stem and Acetabular systems.



## Patient selection

Almost any patient who is a candidate for total hip arthroplasty can be a candidate for the Anterior Path Approach. It is recommended for surgeons to begin with more standard hip replacement patients. Thin patients with few osteophytes, well maintained motion, and bone of good quality are often good choices early in a surgeon's learning curve. As surgeons gain experience and familiarity with the technique, more complex cases can be addressed with this approach.

## Preoperative planning

Templating is strongly recommended prior to the execution of any total hip arthroplasty procedure. Accurate preoperative templating requires high quality standardized radiographs of the appropriate anatomy. The surgical approach does not govern the choice of implant, and virtually any implant design can be implanted via a direct anterior approach.

**CAUTION: Preoperative templating is intended for estimation purposes only. Final component size and position should be determined intraoperatively.**

## Patient orientation

Position the patient as you would for a traditional anterior total hip replacement. The Anterior Path® technique does not require any special positioning or orientation of the patient.

# Surgical technique

**DISCLAIMER:** Retractors: Due to the fact that retractor preference varies by surgeon, the use of the term “retractor” will serve as a place holder for the surgeon's choice of retractor.

FIGURE 1

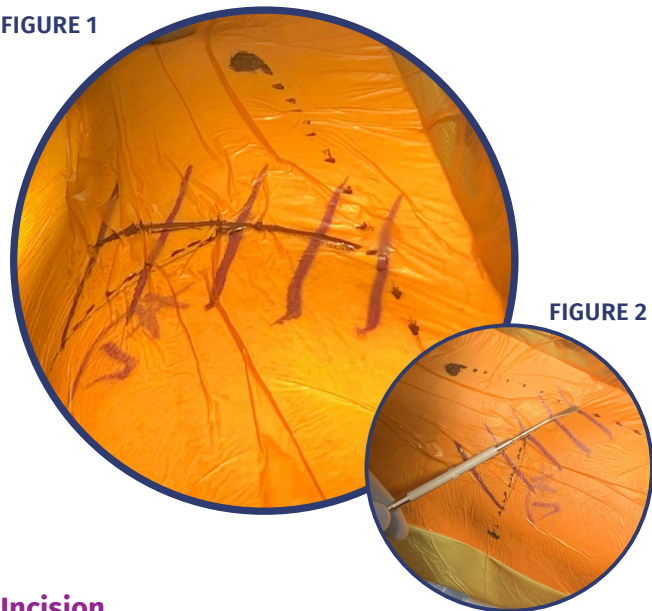


FIGURE 2

## Incision

1. Identify the Anterior Superior Iliac Spine (ASIS)
2. Identify the Patella
3. A line is then drawn from the ASIS extending inferiorly to the superior aspect of the patella. (Safe Zone Boundary)
4. Flex the hip & identify the inguinal crease.
5. The incision line is drawn.

\*Initiated at the Safe Zone Boundary 5-10mm inferior to the inguinal crease

\*Extends 7-10cm long superior-laterally, parallel to the inguinal crease | **FIGURE 1**.

**This will be the incision line.**

**NOTE:** Proper placement of the incision can be confirmed with radiographs by laying a dental freer over the planned incision site. The image should confirm the incision location is located over the desired level of neck resection.

The entire procedure, including the deep dissection, will remain lateral to the Safe Zone Boundary to avoid neurovascular injury.

**NOTE:** The incision can be extended laterally as needed.

**NOTE:** Langers lines run in a transverse/horizontal direction on the thigh and therefore the incision should be made accordingly.

FIGURE 3

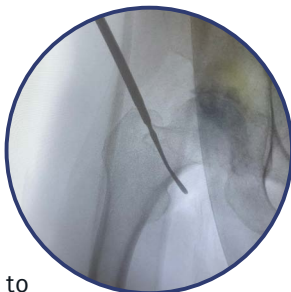


FIGURE 4

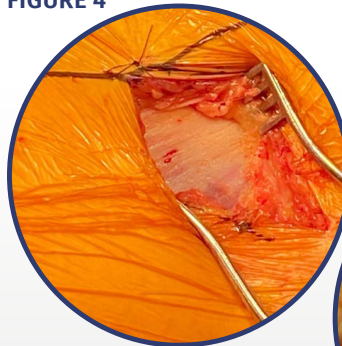
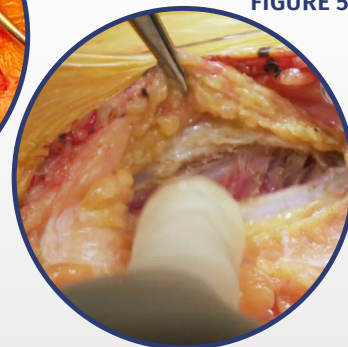


FIGURE 5



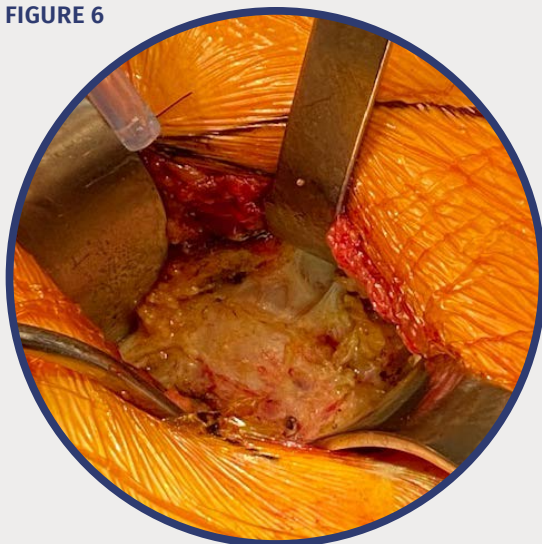
## Superficial dissection

Following the skin incision, dissect through the superficial fat layer along the direction of the incision. While still staying in the middle of the fat layer, change the orientation of dissection to now go along the course of the Tensor Fasciae latae (TFL). This is done to avoid possibly cutting directly across the fibers of the lateral femoral cutaneous nerve (LFCN). Continue dissection in this direction until the thin layer of fascia overlying the muscle belly of TFL is encountered | **FIGURE 4**. Split the fascia over the muscle belly of the TFL in line with the fibers. Elevate the fascia anteriorly and gently off of the muscle. Gently insert a finger under the fascia and into the interval between the TFL and the Sartorius muscle | **FIGURE 5**. Advance the finger medially and superiorly and identify the superior femoral neck.

Although the circumflex vessels are generally seen less than half the time using an Anterior Path® incision, they should be ligated or cauterized when visible within the surgical field. Inferiorly, identify the inferior femoral neck and place a retractor. Dissection can now be continued medially under the Sartorius and the two heads of the Rectus femoris muscle.

A finger is placed under the Tensor Fasciae Latae up to the anterior superior iliac spine and then angled straight posterior will generally allow identification of the femoral neck.

FIGURE 6



### Capsular exposure

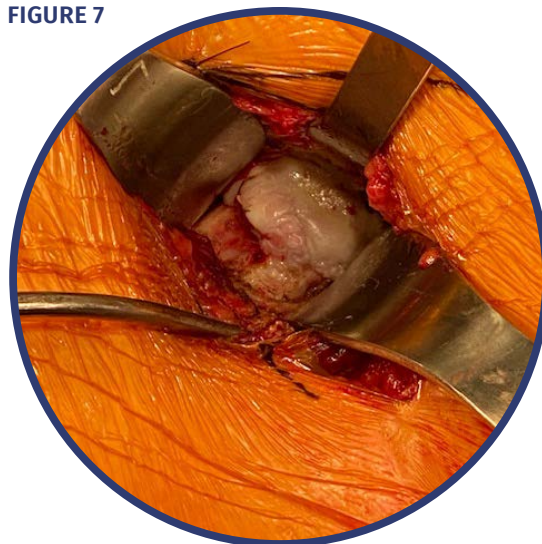
During initial dissection the sartorius muscle is retracted medially. The next step is to enter the fascia of the rectus femoris and retract this medially with the sartorius. Digital palpation should allow identification of the superior-lateral portion of the femoral neck.

The capsular head of the rectus femoris is dissected off the capsule using the Cobb elevator or electrocautery. The amount of rectus covering the capsule is highly variable. If the rectus is primarily medial, little work is required. If the rectus lies more lateral across the neck, more effort may be required to develop the plane. If necessary, release the reflected head of the rectus at its capsular origin for it to retract medially.

Place Retractor on the anterior rim of the acetabulum to retract the rectus tendon medially | **FIGURE 6**. Great care is taken to ensure that the anterior retractor is placed directly on the bone of the anterior rim of the acetabulum. This retractor placement should provide an excellent view of the entire anterior joint capsule.

**CAUTION:** Placement of the retractor on the anterior rim of the acetabulum carries potential risk to the neurovascular bundle (femoral nerve and vessels). Prevent damage by ensuring that the retractor is under the rectus and that the retractor's tip is firmly positioned on bone at the anterior acetabular rim. Keeping the retractor perpendicular to the ilioinguinal band and under the iliopsoas muscle will minimize potential damage to the neurovascular bundle.

FIGURE 7



### Capsulotomy/Capsulectomy

Surgeon preference will determine whether a capsulectomy or capsulotomy will be performed. For an inverted T-shaped capsulotomy, first perform a linear anterolateral capsulotomy in line with the axis of the femoral neck starting at the rim and end at the intertrochanteric line. To complete the inverted T-shaped capsulotomy, start at the anterosuperior aspect of the neck and release anterior capsule along the trochanteric line as far distal to the lesser trochanter as possible. External leg rotation will assist in the distal portion of the release.

Alternatively, a wide capsulectomy may be performed. If a capsulectomy is performed it should be performed laterally to the inter-trochanteric line releasing both the pubofemoral ligament and the ischiofemoral ligament if possible to aid latter femoral exposure. A rectangular capsulectomy between the anterior rim of the acetabulum and the intertrochanteric line is created.

Following either capsulotomy or capsulectomy, retractors are relocated to an intracapsular position to protect the capsule and surrounding structures during the neck osteotomy | **FIGURE 7**. In addition, releases of the capsule off the femoral neck both superiorly and inferiorly may be performed at this point. This will aid in eventual external rotation and adduction of the leg to access the femoral neck for preparation. Femoral release will also improve mobility which may facilitate acetabular exposure.

## Osteotomy

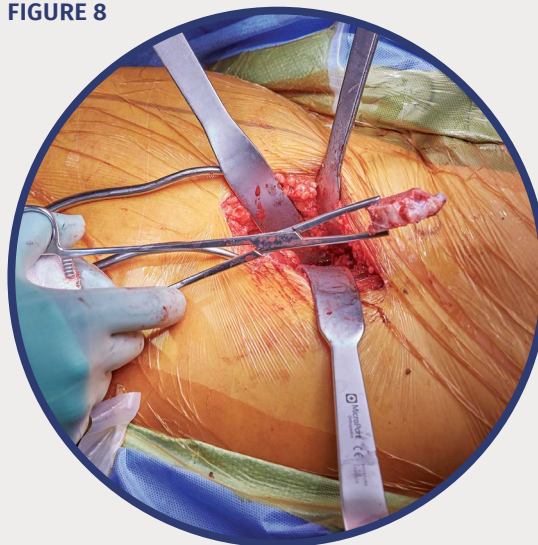
If using a positioning table place the rotation of the femur at 45 degrees and plan the angle of the neck cut accordingly. If using a standard OR table, note the rotation of the leg so as to make an accurate cut. If templating your femoral neck, cut off the distance from the head/neck junction distally rather than any distance from the lesser trochanter. Proximally may be a better landmark as the lesser trochanter is difficult to visualize and/or palpate anteriorly. Create space for the femoral head extraction by first removing a 5-10 mm wafer of the femoral neck | **FIGURE 8.** Make an initial cut at the head/neck junction and a secondary cut parallel and distal to the first cut. Careful templating can identify an appropriate location of the more inferior cut. Remove the wafer with either a Steinmann pin or lever the wafer out with a Cobb elevator and forceps.

Insert the Corkscrew through the cortical bone of the head. Pre-drilling a pilot hole may facilitate penetration of the head with the Corkscrew device | **FIGURE 9.** With a power driver on ream setting, spin the head until ligamentum teres ruptures. If head extraction proves difficult, rotate the femur to access ligamentum teres and cut with electrocautery or capsular scissors. Extract the head by levering the head toward the opposite shoulder while maintaining awareness of the cut edges of the neck, which could damage TFL. The T-Handle can assist with head removal when leveraging with a drill is cumbersome.

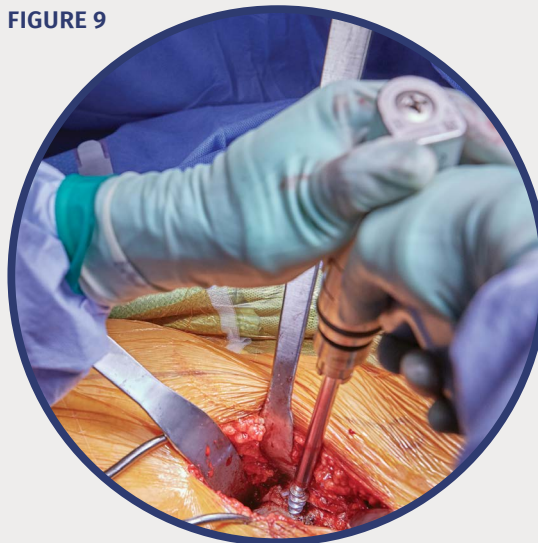
**TIP:** Prior to extraction, orient the femoral head such that the smooth, spherical portion, not the cut surface, is against TFL.

If using the positioning table, slight traction can be placed on the leg and a retractor is placed between the femoral neck and the posterior wall of the acetabulum. With a standard table, the femur is now externally rotated. The ankle of the operative leg can be placed over the contralateral ankle in a gentle “figure of 4” position. The medial capsule can be released from the bone in the calcar region. This will allow for palpation and direct visualization of the lesser trochanter. Again, preoperative templating is relied upon to determine the position and angle of the final neck cut. An additional neck cut can be performed at this stage as necessary. Consider the use of fluoroscopy to ensure precision. Redundant capsule and degenerative tissue/pulvinar within the acetabulum and the labrum can now be excised to enhance visualization.

**FIGURE 8**



**FIGURE 9**



**CAUTION:** When making the final neck cut, be careful to manage the lateral excursion of the saw blade. If the trochanter is scored, it will potentially increase the risk of fracture when the femur is elevated. To minimize this risk, consider using a tissue preserving precision saw.

**TIP:** A high neck cut will hamper acetabular access when reaming. A high neck cut also hampers lateral access to the femur when broaching, which causes varus oriented stems.



Alignment Handle  
P/N 20071009



Portal Placement Guide  
P/N 20070015



Trial Cup  
P/N 20070146



Blunt Trocar  
P/N 20070116 or 2007XL16



Cannula  
P/N 2007ST20 or 2007XL20

FIGURE 10

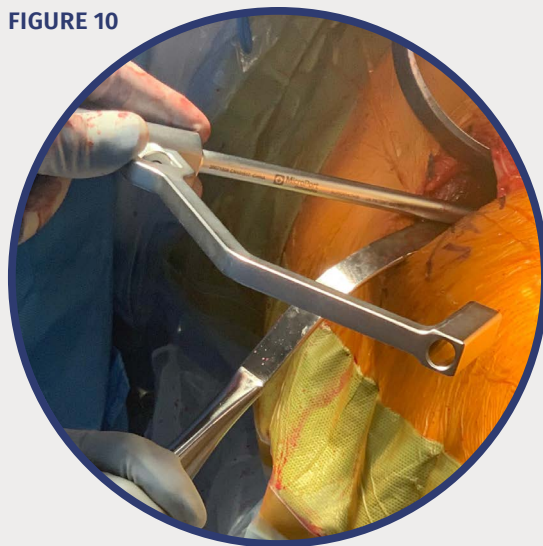
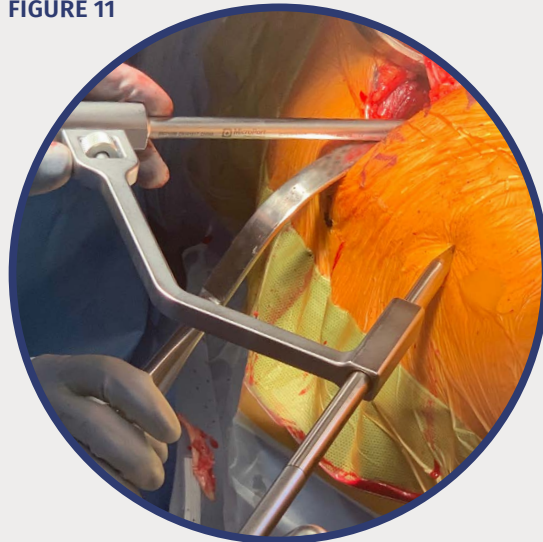


FIGURE 11



## Portal assisted acetabular preparation

The Alignment Handle / Portal Placement Guide / Threaded Cup Adapter / Trial Cup Assembly are seated in the acetabulum | **FIGURE 11**. Under direct visualization or fluoroscopically, the trial cup is placed in an orientation which would be the anticipated final cup position in terms of abduction angle and anteversion angle.

The cannula is placed over the blunt trocar and the blunt trocar and cannula assembly are inserted until resting against the skin of the operative leg | **FIGURE 11**. At this point a 1cm stab incision is made. The blunt trocar and cannula are then passed through the stab incision, usually through the belly of the vastus lateralis, until they are visible through the main incision.

**SPECIAL NOTES:** Leg needs to be in a neutral position when placing the trocar to minimize neurovascular injury.

**The XL cannula is only compatible with the XL instruments.**

**The XL instruments are compatible with any length cannula.**

**The XL drill is only compatible with the XL drill tube.**

## Position of the leg during cannula placement – VERY IMPORTANT

To safely place the Portal placement guide, make sure the leg is in neutral abduction/adduction and the leg rotation is in the neutral position. This will ensure the femoral nerve and vessels are out of danger.

As with any percutaneous procedure, if portal placement is suboptimal, the surgeon can create a new stab incision and reposition the portal.

Repeat incisions for placement of the portal are rarely necessary as the portal/cannula is a fairly mobile window to the acetabulum.

## Acetabular reaming

Using the Reamer Basket Holder, pass the appropriately sized Hex Acetabular Reamer into the main incision. The reamer basket is placed through the main incision, into the acetabulum in the appropriate orientations. The Reamer Shaft is passed through the Portal and mated to the Hex Acetabular Reamer in situ. Acetabular preparation is performed using the preferred reaming method. Medial reaming may be carried out through the main incision prior to deepening/ enlarging the acetabulum. When medializing, ream 1-2mm less than the desired depth. The final reamer will be used to ream to the desired level of medialization.

FIGURE 12



Hex Acetabular Reamer  
P/Ns PATHRM40 - PATHRM64  
or SPTHRM40-SPTHRM65 or  
PATHRM40CN-PATHRM70CN



Reamer Shaft  
P/N 20070011 or 2007XL11

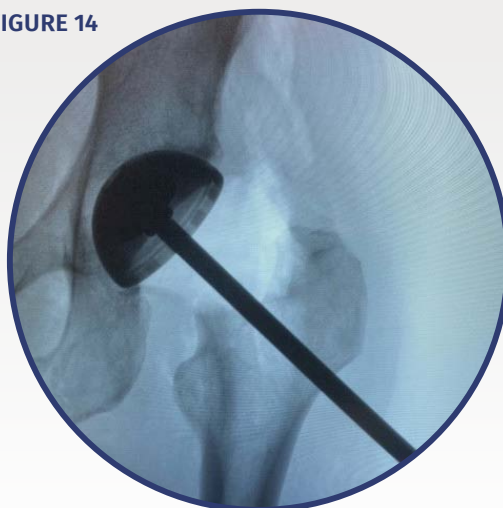


Reamer Basket Holder  
P/N 20070048

FIGURE 13



FIGURE 14





Prime Cup Impactor Portal  
Adapter  
P/N P3CIMPAD



Cup Impactor  
P/N 20071010



Screw Drill  
P/N 20071007 or 2007XL07



Straight Screwdriver  
P/N 20071003



Ratchet Screwdriver Handle  
P/N 2002QCRH



Drill Tube  
P/N 20071012 or 2007XL12



Ball Joint Screwdriver  
P/N 20071002



Screw Holding Forceps  
P/N 4820SH0000



Liner Impactor  
P/Ns 20070023 - 20070025

FIGURE 15

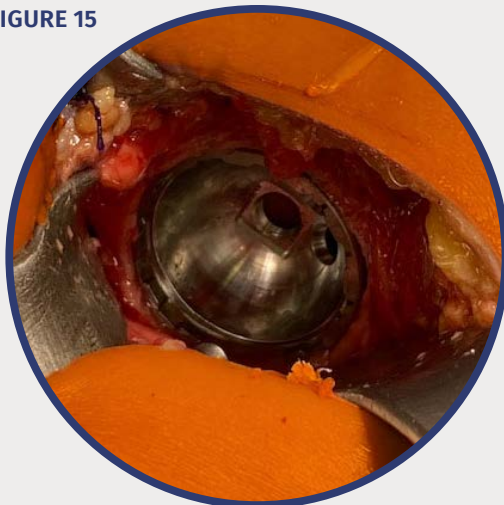


FIGURE 16

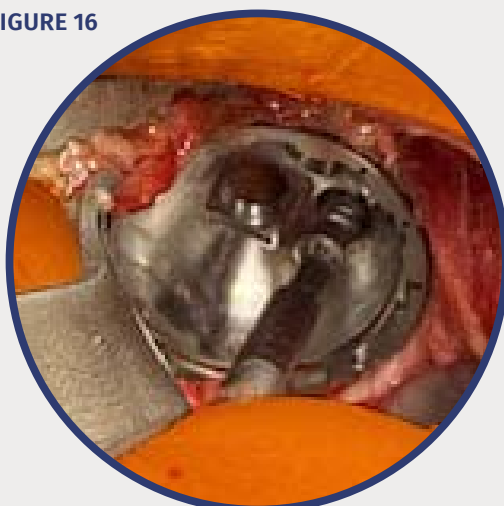


FIGURE 17



## Cup placement

The Threaded Cup Adapter is threaded completely into the apical hole of the acetabular cup, and the assembly is seated on the Alignment Handle. The Cup is inserted into the Acetabulum. (Please take note of the screw hole orientation upon insertion into the Acetabulum) | **FIGURE 15**. The alignment handle is subsequently removed. The cup impactor is inserted through the cannula until fully seated in the dimple of the threaded cup adaptor. Provisional impaction of the acetabular component under direct visualization is performed, then fluoroscopy is brought in to dial in and optimize the cup position prior to final impaction. The cup is seated into the acetabulum and final placement is confirmed using imaging and the thread is unscrewed using the impactor.

**CAUTION:** If repositioning of the cup is needed, the cup must be removed and reimpacted with firm blows; avoid hitting the rim of the cup to change angle, this could result in potential for loosening.

## Screw placement

Pilot holes for the placement of acetabular screws are created by inserting the Long Drill Tube through the Portal until it engages the desired hole in the acetabular cup. The Screw Drill is then passed through the Long Drill Tube. Using the measurement markings on the end of the Screw Drill, drilling is carried out to the desired depth. The Screw Drill and Long Drill Tube are removed. Screws can be held in position using a set of Screw Holding Forceps through the main incision, and the Ball Joint Screwdriver or Straight Screwdriver is attached to the Ratchet Screwdriver Handle and passed through the Portal to engage and tighten the screw(s) | **FIGURE 16**.

## Liner placement (trial or implant)

At this juncture, the trial liner of choice or the final implant liner may be placed into the cup.

Upon choosing the final liner, the associated tapers are cleaned and dried, the liner implant of the acetabular cup is then impacted into position using the Cup Impactor (through the Portal) and the appropriate Liner Impactor | **FIGURE 17**.

The liner impactor ball has cutouts to allow for easy grip and extraction with a Kocher clamp or similar device.

## Femoral exposure

### Option 1: No positioning table Femoral exposure

The nonoperative leg is elevated on a padded Mayo stand. The operative leg is now placed in a gentle “figure of 4” position by externally rotating the femur and gently sliding the ankle of the operative leg under the contralateral ankle. Note that too much knee flexion will place tension on the rectus musculature which may hamper femoral elevation.

Prior to elevation of the femur, the retractor is placed on the medial aspect of the proximal femur. Proper positioning will retract the femur laterally away from the pelvis, preventing the hook of the Greater Trochanter from being captured behind the posterior wall of the Acetabulum, aiding in elevation | **FIGURE 18**.

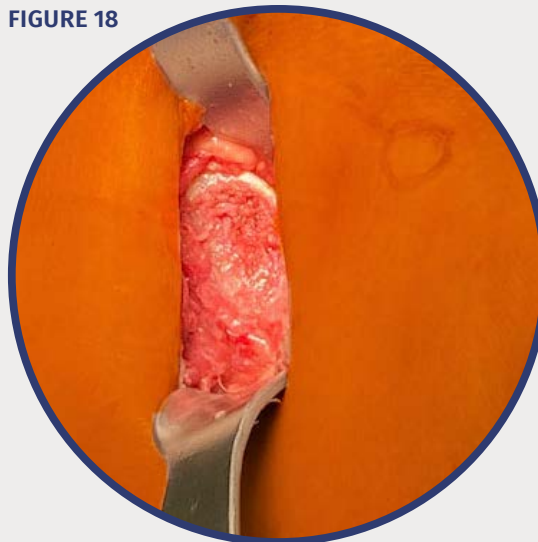
### Option 2: Using a positioning table

If using a positioning table, the leg is lowered, adducted and externally rotated.

The retractor is now placed behind the greater trochanter, retracting the gluteal muscles superiorly. Release superiolateral capsule with electrocautery, using longitudinal sweeps starting at superior capsule and moving superiorly along the inner (medial) aspect of the greater trochanter.

After ensuring traction has been released on the table, use the Bone Hook to gently elevate the femur anterolaterally into the surgical site, and use a retractor placed behind the greater trochanter to maintain elevation. Extend the hip by lowering the foot of the surgical table 20-30°. The leg is externally rotated 90° and adducted. External rotation positions the greater trochanter behind the pelvis, so use the retractors to guide the delivery of the femur laterally around the acetabulum.

**FIGURE 18**



*Bone Hook  
P/N 20162009*



Box Chisel  
P/N 2016MBXC or PRMOD500



Curved Rasp  
P/N 20162008



Offset Broach Handles  
Left: P/N ATCEOGHL/ATCENZL2  
Right: P/N ATCEOGHR/ATCENZR2



NOTE: A neutral offset broach handle is also available, ATCEOGN1/ATCENZN1

FIGURE 19

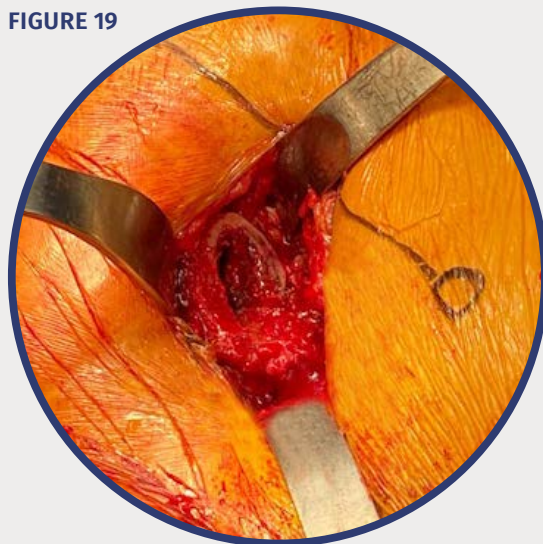


FIGURE 20

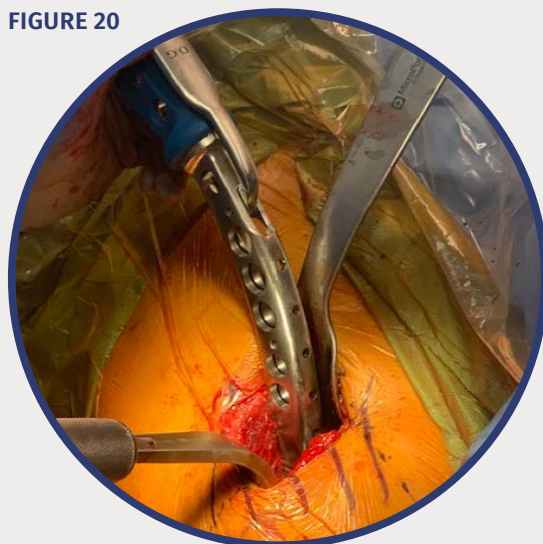
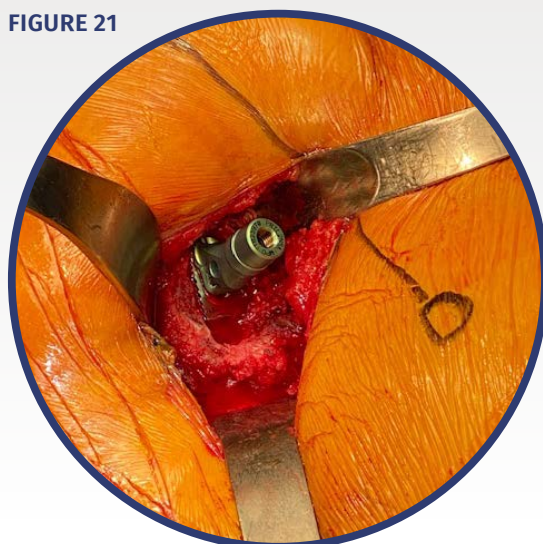


FIGURE 21



## Femoral preparation

Femoral preparation proceeds in the surgeon's preferred fashion | **FIGURE 19**. Open the femoral canal with the Box Chisel. Enter the femur in the posterolateral region to avoid creating a metaphyseal envelope that encourages varus alignment, which leads to stem under sizing. Removal of a small portion of the posterolateral cortical bone may facilitate appropriate alignment within the femur. Use the Curved Rasp to identify the intramedullary canal and prevent perforating the lateral cortex when broaching.

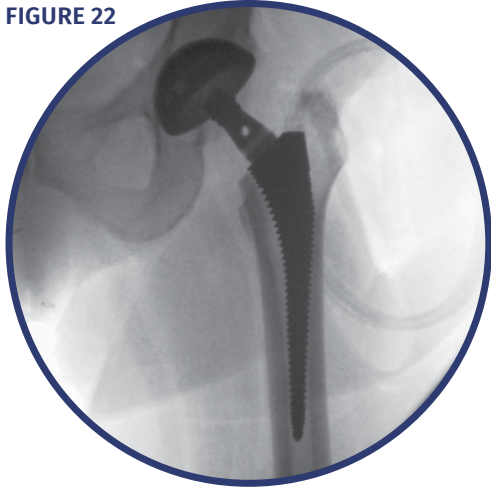
**CAUTION:** Perforating the lateral cortex will increase the risk of trochanteric fracture during femoral elevation

Utilize the rasp to open the lateral aspect of the metaphyseal bone. Refer to the surgical technique of the desired stem. Broach sequentially until appropriate stem size is reached, and keep the broach in place for trialing | **FIGURE 20**. During broaching the orientation of the broach is generally oriented parallel to the posterior femoral neck, which during femoral preparation appears medially within the incision. Offset Broach Handles facilitate femoral preparation. Use trial necks and heads to identify the combination that most closely replicates the desired offset and leg length | **FIGURE 21**. The hip may be guided through a range of motion to confirm anterior and posterior stability while matching leg length. Fluoroscopy is utilized to confirm appropriate sizing and alignment of the broach | **FIGURE 22**.

**CAUTION:** Although testing for posterior stability is important, care should be taken to avoid a full posterior dislocation while trialing. If the hip is allowed to dislocate posteriorly, the trial head may disengage from the trial neck and may prove difficult to retrieve. Gentle flexion and internal rotation to feel slight tension on the posterior capsule is generally sufficient.

**TIP:** If broaching feels tight before reaching the templated stem size, the broach is likely aligned too varus or that the femoral neck cut is too long. Use the rasp to remove lateral cancellous bone and rebroach. Box osteotome may further aid in obtaining a more lateral position.

**TIP:** Ensure consistent envelope alignment by maintaining a constant angle of external rotation throughout femoral preparation.

**FIGURE 22**

### Stem insertion

Impact the final prosthesis per the appropriate stem surgical technique using a stem impactor and Head Impactor. A subsequent trial of the femoral head may be performed as desired. The final head is then impacted onto a clean and dry morse taper using at least 3 firm mallet blows. Final reduction is performed. Fluoroscopy is used to confirm final implant position. | **FIGURE 23**

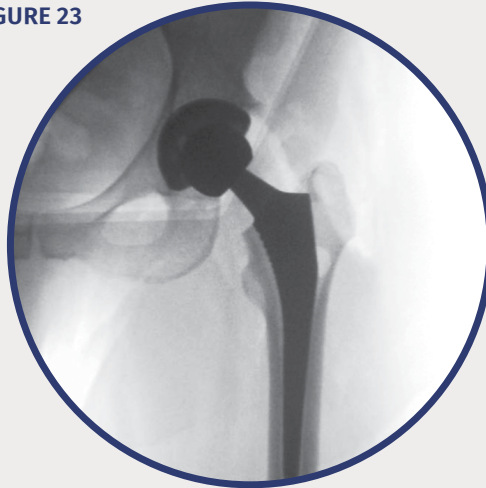
### Closure

Following appropriate wound irrigation, the wound is closed. Capsulotomy is closed as needed. The fascia overlying the TFL should not be under tension and may be closed in a running fashion. Subcuticular closure of the skin is preferred, as patients can find staples uncomfortable in the position of the incision.

### Revisions

If the removal of the implant is required due to revision or failure of the device, the surgeon should contact the manufacturer using the contact information located on the back cover of this surgical technique to receive instructions for returning the explanted device to the manufacturer for investigation. A traditional exposure can be used to extract implants.

Please refer to each specific device surgical technique document to find removal instructions for that device.

**FIGURE 23**

### Postoperative care

Postoperative care is the responsibility of the medical professional, who will guide the postoperative management of each individual patient. Generally patients with good quality bone are allowed to advance weight bearing as tolerated. Hip dislocation precautions are generally not required, however, patients should be advised to avoid excessive hyperextension and external rotation of the hip in the early postoperative period.

### Retractor options



## Notes

[illegible]

## Notes

[illegible]



MicroPort Orthopedics Inc.  
5677 Airline Road  
Arlington, TN USA 38002  
866 872 0211

[microportortho.com](http://microportortho.com)

The CE-Marking of Conformity is applied per catalog number and appears on the outer package label, if applicable.

Trademarks and Registered marks of MicroPort Orthopedics Inc.  
© 2022 MicroPort Orthopedics Inc. All Rights Reserved.  
022024E SEP2022