



# Supine Anterior Total Hip Replacement

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Supine anterior total hip replacement is quickly becoming a common procedure in today's operating room. In 1881, Carl Hueter described the approach and then Marius Smith-Peterson expanded and published the idea in 1917. In 1980, TR Light and KJ Keggi are credited with expanding the idea and adding the use of a fracture table in 1985.

**T**his method has become increasingly popular over the last 15 years due to the push for tissue sparing, minimally invasive procedures and medical innovations that make this option easier and faster. Evidence suggests that the anterior supine approach has less of a dislocation rate early on, and as long as six weeks post-op as compared to the posterior approach. After the six-week mark, the anterior and posterior approaches have a similar recovery and dislocation rate. The selection process for this procedure is more rigorous than the posterior approach. The ideal patient for a supine anterior total hip replacement has a BMI of less than 30, is active, flexible, and non-muscular, has a valgus femoral neck and a good femoral offset. This approach also can be used for hip revisions and hemiarthroplasties.

There are many products on the market that make the anterior approach total hip replacement a faster and easier procedure. A fracture

## LEARNING OBJECTIVES

- ▲ Review the anatomy that is affected during this procedure
- ▲ Determine who the ideal patient is for a supine anterior total hip replacement
- ▲ List the equipment and instrumentation needed for this procedure
- ▲ Examine the procedural steps for this operation
- ▲ Discuss the benefits of this approach versus the posterior approach

table with femur lift is crucial for positioning and exposure. Microplasty retractors also aid in providing good exposure of the hip components. For the purpose of this article, the anterior supine intramuscular total hip arthroplasty surgical technique in conjunction with the fracture table will be referenced.

## POSITIONING

After the timeout is performed, the patient is placed under general anesthesia. The patient is in the supine position on the fracture table with both feet placed in the appropriately sized boots and attached to the bed. The groin post is placed in position with proper padding in contact areas. The arms are both placed extended on arm boards less than 90 degrees. The removable leg pad board is taken off the bed. The patient is now in the supine position with their legs suspended in neutral position and all pressure points are again checked to ensure patient safety.

## PREPPING AND DRAPING

After positioning and prior to prepping the patient, the surgical area is draped with a clear U-split drape and a clear bar towel drape from the apex of the pubic crest to the above the knee, then precleaned with 70 percent isopropyl alcohol and allowed to dry. The circulating nurse uses chlorhexidine gluconate to prep the surgical area inside the U-drape and clear bar towel drape. After the three-minute drying time, the sterile drapes are placed. First, a top drape or a bar drape is used from the knee to the foot. On top of the top drape, two impervious blue U-split drapes are placed to isolate the surgical site. Next, chlorhexidine gluconate is applied again to the surgical site. The next layer is made up of two top split drapes. The incision is marked with a surgical marker running on top of the greater trochanter from two finger widths below and two finger widths lateral to the anterior superior iliac spine (ASIS). The surgeon will stay lateral to the tensor-sartorius interval to avoid the lateral femoral cutaneous nerve, which is approximately 30 degrees away from the midline of the ASIS. The antimicrobial incise

drape is placed over any skin that is exposed. A V-pouch drape is placed on the split drape posterior to the incision to catch any blood or fluid that might come from the wound. An ESU Bovie pencil, suction, pulse lavage suction irrigator, and a tissue sealer coagulator are used on the field and the circulator connects the unsterile end to the generator. The fracture table and femur lift are placed on the bed. The bar is impacted onto the lift and the pedal is pressed to ensure that the femur lift is working.

## PROCEDURE

An incision is made approximately one centimeter lateral and distal to the anterior superior iliac crest and extended distally and laterally over the tensor fascia muscle belly, with a 10 blade on a #3 handle. Bleeding is controlled through use of electrocautery. The surgeon begins dissecting down through the layers and places a deep Gelpi retractor in the wound for better visualization. A Cobb elevator is used to dissect the fat tissue from the fascia. A 15 blade on a #3 handle is used to make an incision the length of the skin in the fascia. On the anterior edge of the fascial incision, two Allis clamps are placed and the muscle layer is dissected from the fascia with a Cobb elevator. The two Allis clamps are removed and placed on the posterior edge, and the same dissection occurs. The Allis clamps are removed, and the muscle is separated bluntly. The tensor fascia lata

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(TFL) is mobilized laterally and the deep Gelpi retractor is repositioned along with a #7 Hohmann retractor to visualize the floor of the TFL fascia. Dissection continues through the floor of the TFL until the capsule is palpated and circumflex arteries are controlled with the ESU Bovie. A #6 Hohmann is inserted under the rectus femoris. Pericapsular fat is debrided and the head of the rectus femoris is released to aid in the exposure of the femoral neck. An inverted T capsulotomy is performed anteriorly and superiorly with the

edges of the capsule being tagged with two stitches of #5 braided polyester suture. They are thrown and tagged with a hemostat; a curved hemostat goes on the stitch through the anterior aspect and a straight hemostat goes through the posterior aspect. The retractors are repositioned intracapsular and the operative leg is externally rotated. Next, the pubofemoral ligament is released to the superior lesser trochanter and the operative leg is rotated back to neutral. The sterile C-arm is used to take an AP image of the pelvis so that the ilioschial lines are crossed symmetrically along the medial borders of the tear drops of both hips. An AP image of the non-operative hip also is taken and printed on acetate film for templating purposes. While this is printing, setup for the osteotomy of the operative hip begins. The level of the cut is determined preoperatively through templating but verified through fluoroscopy with the C-arm. The cut is marked with the ESU Bovie and performed using a sagittal saw blade. Special attention needs to be paid to the greater trochanter to avoid injury. The osteotomy also could be made using two parallel neck cuts: one at the head neck junction and the other 5 mm to 1 cm distal to the initial osteotomy, and the bone segment is removed. Either way is considered normal. Gross traction is applied to the operative hip and a power corkscrew is placed in the cortical side of the femoral head. A T-handle corkscrew is twisted into the bone, and the femoral head is removed. If the femoral head is not easily delivered, a Bachus towel clamp is used to grab the cortical bone near the neck cut, and then traction is applied to remove the femoral head from the socket.

Once the borders of the acetabulum are exposed, and the retractors are placed extra-labral but also intracapsular to obtain an unobstructed view of the cup. According to the Biomet technique guide, a #9 retractor is placed on the anterior aspect of the acetabulum. A double pronged Mueller typed retractor, or #8, is placed on the posterior border and downward pressure is applied. This action tucks the femur out of the way giving the acetabular better exposure. A long-curved cobra, or #6 Hohmann, is placed on the inferior side of the acetabulum behind the transverse acetabular ligament. Care is taken to protect the tensor and rectus muscles and to avoid neuro-vascular structures. Labral tissue and pulvinar are removed with electrocautery and the acetabulum is prepped for reaming. Any central osteophytes are removed with an osteotome and mallet as to not throw the reamer unbalanced

Instrumentation for Direct Anterior Total Hip Arthroplasty
<b>Basic Instrumentation</b>
10 blade loaded on a #3 handle
15 blade loaded on a #3 handle
Ferris Smith forceps
Adson forceps with teeth
Cobb elevator
Large rongeur
Heavy mallet
Long Schmidt tonsil forceps
Bachus towel clip
2 Allis clamps
Straight hemostat
2 curved hemostats
Straight Mayo scissors
2 shorter and 2 longer needle drivers
Power corkscrew with T-handle
Sagittal saw with blade
<b>Retractors</b>
Hohmann retractors 1, 2, 6, 7, 8, 9, 10
Hooks (side specific) and attachment bar for the fracture table
Deep Gelpi

when reaming. An offset reamer shaft with acetabular cup reamer head is chosen by measuring the explanted femoral head and subtracting two to three sizes. The acetabulum is reamed under fluoroscopy with the C-arm, working up in size until the true floor is reached and then progressively to 40 degrees lateral inclination or abduction and 20 degrees of anteversion is obtained. The acetabular cup component on an offset handle are impacted in place and confirmed with fluoroscopy. A round secondary cup impactor head is placed on the offset handle and used to seat the cup if necessary. If present, periacetabular osteophytes are removed with a

curved osteotome, mallet, and rongeur. If screws are necessary for fixation of the cup, they are placed. The component is then irrigated and any soft tissue is removed. The permanent implant liner is impacted with the secondary impactor and seated. The anterior hip soft tissues are injected with the local anesthetic solution.

Blunt dissection under the TFL following the anterior and lateral trochanter helps to ensure no entrapment of posterior tissues and helps with proper exposure while prepping the femur. The fracture table hook femur attachment is placed around the proximal femur at the level of the vastus ridge. The operative leg is externally rotated to 120 degrees and the hip is extended and adducted. The fracture table lift pedal is pressed and the femur is lifted until the osteotomy plane is easily visualized. Two #7 retractors are placed along the posterior and medial femoral neck at the level of the

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greater trochanter to protect the abductor attachment. The lower retractor can be wedged under the retractor bar to aid in retraction. This enables the assistant to suction. It is important to take care in retracting in this area too much as pressure may result in a fracture of the greater trochanter. Dissection with electrocautery releases the superior hip capsule posteriorly along the inner greater trochanter to the level of the piriformis fossa. Everything is assessed for mobilization and if more visualization is needed, the obturator internus and/or the piriformis are released. Residual remnants of the superior neck are removed with a rongeur. The offset handle canal finder is used to confirm the direction of the broaching to avoid cortical breaches. The leg still is fully extended and externally rotated so the foot is parallel to the floor. The smallest broach on a curved (side specific) handle is impacted into the canal, graduating in size until the largest possible broach may be inserted. It is important for the final broach to fit well in the canal but move axially and rotationally. Next the femoral neck is assessed for

fracture both anteriorly and posteriorly. The calcar planer on power is used to remove excess bone from around the trail. The appropriate neck and head trails are chosen by templating and are trialed. Their hip is then reduced by manipulation and the C-arm is used to obtain an AP image of the operative hip with the rotation matched to the non-operative leg for templating purposes. The image is printed on acetate film and overlaid with the original film to access the limb length and offset to confirm satisfactory placement. The operative leg is externally rotated to 75 degrees and the hip is extended to 45 degrees to check for subluxation or dislocation. Once proper restoration of the hip mechanics is obtained, and stability is checked, the hip is dislocated and the trials are removed. The wound then is irrigated with an antibiotic irrigation. The femoral stem implant is impacted into the canal and the proper sized head is impacted onto

a clean morse taper. Again, the neck is checked for fracture and the implants are checked for fit and stability while the dorsalis pedal pulses are checked to ensure adequate blood flow.

The wound again is irrigated, and any bleeding is controlled by electrocautery. The anterior capsule is repaired with suture and

the soft tissues are injected with the remainder of the local anesthetic. The TFL is closed with a 0 barbed absorbable monofilament suture. The subcutaneous tissues are closed in layers with barbed monofilament sutures. The wound is cleaned and dressed with a hydrofiber wound dressing.

Anesthesia is reversed once the patient has been extubated, and the patient is transferred from the fracture table to the post-op bed or cart. For this process it is helpful to use a transfer board to help close the gap between beds. The patient is then sent to the Post Anesthesia Care Unit (PACU) where they will continue their recovery. For post-operative care, it is important to keep the hip in slight flexion as the patient is waking up from anesthesia as this helps prevent dislocation.

One of the benefits of the anterior approach total hip replacement is enhanced stability. The patient will be encouraged to walk with a walker or crutches as soon as they feel able and will be full weight bearing the next day as tolerated. The patient may stay in the hospital as long as two

to three days to aid in recovery and start physical therapy. Depending on the patient, an earlier discharge is possible.

The anterior approach supine total hip replacement is a good option for patients needing a total hip replacement. It is less minimally invasive than the posterior approach, with a better dislocation rate for the first six weeks. This procedure can be a quicker operation than the posterior approach and uses less instrumentation.



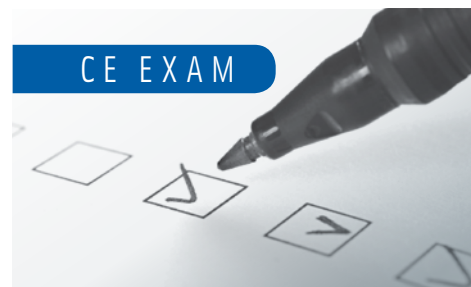
#### ABOUT THE AUTHOR

Heather Everett, CST, CSFA, is a 2012 graduate of the Vincennes University Surgical Technology program, instructed by the late Chris Keegan. She has associate degrees in general science, psychology, and applied sciences. She received her CSFA in May 2017. She currently

works at IU Health Bloomington Hospital, specializing in orthopedic joint replacement. She also enjoys many other specialties including orthopedic trauma, peripheral vascular, neurosurgery, and general surgery. She is a working mom and wife who loves her profession and strives to provide the best patient care possible.

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# Supine Anterior Total Hip Replacement

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1. The ideal patient for a supine anterior total hip replacement exhibits the following:
  - a. BMI of less than 25
  - b. Flexible
  - c. Non-muscular
  - d. Only b and c
2. When was the procedure supine anterior total hip replacement first described?
  - a. 1881
  - b. 1885
  - c. 1888
  - d. 1895
3. When the patient is positioned, their arms are both placed extended on arm boards \_\_\_\_\_.
  - a. Greater than 90 degrees
  - b. Less than 50 degrees
  - c. Less than 90 degrees
  - d. Greater than 110 degrees
4. The patient is draped from the apex of the pubic crest to \_\_\_\_\_.
  - a. The upper thigh
  - b. Above the knee
  - c. Below the knee
  - d. Above the ankle
5. The incision is marked with a surgical marker running on top of the greater trochanter from two finger widths \_\_\_\_\_ and two finger widths \_\_\_\_\_ to the anterior superior iliac spine (ASIS).
  - a. Below, lateral
  - b. Below, anterior
  - c. Above, lateral
  - d. Above, posterior
6. A femoral head is removed after a \_\_\_\_\_ is twisted into the bone.
  - a. T-handle corkscrew
  - b. Power corkscrew
  - c. Bachus towel clamp
  - d. #9 retractor
7. Which action tucks the femur out of the way giving the acetabular better exposure?
  - a. Applying lateral pressure
  - b. Applying pressure to the posterior border
  - c. Applying downward pressure
  - d. Lifting the posterior border anteriorly
8. If present, periacetabular osteophytes are removed with which of the following?
  - a. Mallet
  - b. Rongeur
  - c. Curved osteotome
  - d. All of the above
9. To check for subluxation or dislocation, the operative leg is externally rotated to \_\_\_\_\_.
  - a. 45 degrees
  - b. 75 degrees
  - c. 90 degrees
  - d. 120 degrees
10. The anterior approach supine total hip replacement has a better dislocation rate than the posterior approach during which time period?
  - a. First six weeks post operatively
  - b. First six months post operatively
  - c. First year post operatively
  - d. First five years post operatively

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