Utilizing the Das/Seng Anterior Total Hip Instruments

Retractor set with included table-mounted, controlled-release ratcheting elevator hook, specifically designed to help simplify anterior approach total hip arthroplasty

The procedure has four phases:

Instruments required for each step

1) Exposure of the hip joint
   Retractors #1, 2 and 3.

2) Removal of the femoral head
   Retractors #1, 2 and 3.

3) Acetabular exposure, reaming and cup insertion
   Retractors #2, 3 and 4.

4) Femoral broaching and stem insertion
   Retractors #5, 6 and 7.

Prior to starting the procedure, place the patient on an OR table which has the capacity to be jack-knifed such that the legs may be flexed 60° and the table placed in Trendelenburg. The patient is positioned on the bed so that the symphysis pubis is placed at the level of the break in the bed.

Phase 1. Exposure of the hip joint.

In order to determine the location of the skin incision, the following landmarks are marked:

1. ASIS (anterior superior iliac spine) — marked “A” on Figure 1

2. Center of the patella.

3. A line connecting the ASIS to the center of the patella:
   Draw a point two finger breadths distal and two finger breadths lateral to the ASIS — marked “B” on Figure 1.
   This will be the proximal extent of the incision.
   From that point, draw a line extending distally about the width of your hand (10 cm.) — marked line BC on Figure 1. Intraoperative fluoroscopy Figure 2 is utilized to mark the location of the femoral neck on the skin Figure 3 and “D” on Figure 4.
The femoral neck line should roughly intersect the middle of the intended skin incision. Make the skin incision. The incision is carried down through the subcutaneous tissue to the fascia covering the tensor fascia lata (TFL) Figure 5. The color of the fascia covering the TFL will be darker than the fascia covering the Sartorius muscle which is whiter. This is because one can see the TFL through its thin overlying fascia unlike the Sartorius. This is important because a common mistake is to incise the fascia over the Sartorius rather than the TFL. The problem with this is the femoral neurovascular bundle is medial to the Sartorius muscle. The femoral neurovascular bundle is at risk if the Sartorius is mistaken for the TFL. An easy way to avoid this is to remember that no dissection should be done medial to the line that was drawn from the ASIS to the center of the patella. Incise the facial over the fascia lata (see Figure 6.) The nick in the fascia seen here is extended the full length of the incision. Separate the superior leaf of the fascia off the muscle with a pair of curved Metzenbaum scissors. We prefer to use our index finger to finish separating the fascia from the fascia lata. The index finger is less likely to cause worrisome bleeding from the ascending branch of the lateral femoral circumflex artery and to protect the fascia separating the TFL from the Sartorius. The lower Smith-Peterson interval (between the TFL and the Sartorius) has now been developed (see Figure 6.a showing the TFL/Sartorius interval). It is our hope that these instruments and the helpful hints in this treatise will shorten the learning curve for you. Also please see the article “Anterior-Supine Minimally Invasive Total Hip Arthroplasty: Defining the Learning Curve” by Seng and others in Orthop Clin N Am 40(2009) 343-350.

Using two Myerding Retractors, retract the TFL laterally and the Rectus femoris/sartorius medially exposing the vessels of the ascending branch of the lateral femoral circumflex. Several methods on controlling the vessels have been recommended and the senior author has used them all at one time or another in his career, but by far and away the easiest and most efficient method is that advocated by the junior author (“Enhanced Early Outcomes with the Anterior Supine Intermuscular Approach in Primary Total Hip Arthroplasty” in J Bone Joint Surg Am. 2009;91 Suppl 6:107-20). Using a hemostat, the artery and veins are bovie electrocoagulated. This is important because the vessels travel the entire length of the interval between the TFL and rectus femoris (see Figure 6.b). After you encounter and control them in one place, later in the procedure you will encounter worrisome bleeding again. If one was not aware of the location of the ascending branch of the
lateral femoral circumflex, he or she might be concerned that they had wandered astray into the femoral vessels. Do not be alarmed. As long as one stays lateral to a line drawn between the ASIS and center of the patella with all dissection the femoral vessels are safe. The reemergence of bleeding simply means that the ascending branch of the lateral femoral circumflex has been again encountered superior or inferior to where it was originally boied. Take care to boie this new area of bleeding like the original.

Place retractor #1 extracapsularly superior to the femoral neck. Bluntly develop the plane between the rectus femoris and the vastus lateralis using a Key periosteal elevator. Place the #2 retractor extracapsularly around the inferior femoral neck. Using the Key periosteal elevator, elevate the rectus femoris off of the superior hip capsule. Release some of the reflected head of the rectis femoris’ insertion onto the supraacetabular rim if needed. Place the #3 retractor over the superior rim of the acetabulum with care not to place it into the rectus muscle. Often, this retractor may initially be placed into the hip joint and some joint fluid may be seen. You are now presented with a clear view of the anterior hip capsule. (Figure 7. This is a left hip. Retractor #1 is to the right. Retractor #2 is to the left. Retractor #3 is between the two. (Figure 8 is a close up.) There are two options for exposure of the femoral neck. First, it is reasonable to excise the anterior hip capsule. Alternatively, you may preserve the capsule for closing after the surgery by making an inverted “T” cut and releasing the capsule laterally from the far superior neck to the inferior neck. It is important to release the capsule along the medial calcar to allow for easy removal of the femoral head. The anterior capsule is surprisingly thick (6-8mm).
Phase 2. Removal of the femoral head

Place the #1 and #2 retractors intracapsularly along the superior and inferior femoral neck Figure 9 & 10. Keep retractor #3 on the superior rim of the acetabulum. Place an oscillating saw blade on the femoral neck where the intended osteotomy was template using a C-arm to verify this position Figure 11. The soft tissues will make it difficult to get your blade medially enough. With experience one learns to angle the blade around the soft tissues. It may seem a bit awkward the first several cases but soon becomes natural. It is important to protect the soft tissues from the oscillating saw. Make a second cut about a one centimeter superior to the first one. Remove the napkin ring shaped piece of the femoral neck with a threaded Steinman pin Figure 12. Then remove the femoral head using the same Steinman pin Figure 13.
Phase 3. Acetabular exposure, reaming and cup insertion

Place retractor #2 over the anteromedial aspect of the acetabulum under the caps. Retractor #4 is then placed behind the posterior acetabular wall. The #3 retractor is placed along the anterior superior acetabulum for further exposure Figure 14 and Figure 14a. The labrum is now excised as well as the pulvinar. The inferior capsule may still be tight and options include completing the release off the calcar or splitting the tight fibers below the acetabulum with a bovie or knife. This step is crucial to allow placement of the reamers. Start with a reamer size about 3mm below the templated size, reducing the number of times that a reamer is placed through the wound. Using fluoroscopy, the acetabulum is reamed down to the medial wall (teardrop on fluoroscopy, Figure 15). It is important to protect the soft tissue during insertion and removal of the reamers. To help with this, some companies offer atraumatic reamers with fewer teeth on them. It is important to look for residual posterior labrum after final reaming. Insert a trial cup into the acetabulum to verify stability Figure 16. Then implant the acetabular component Figure 17. Intra-operative fluoroscopy is used to assist with implant positioning Figure 18. Bone screws may be inserted if needed, however keep in mind that the trajectory of these screws may feel awkward compared to the traditional approaches. Fluoroscopy should be utilized to verify appropriate position and length of the screws. Insert the polyethylene into the acetabular shell.
Phase 4. Femoral broaching and stem insertion

Insert the femoral hook (retractor #5) around the proximal femur just distal to the greater trochanter and proximal to the gluteus maximus tendon. This will be used later to retract the proximal femur anteriorly allowing safe broaching and stem insertion. Apply the table assembly (#6) to the table rail. Rest the contralateral (nonoperative) foot on a padded mayo stand. Ask the anesthesiologist to flex the foot of the table about 60° and place the table in Trendelenburg Figure 19. Attach the table assembly to the femoral hook (retractor #5) Figure 20. Apply a minimal amount of anterior retraction to the femoral hook (retractor #5) by turning the crank on the table assembly. Place retractor # 6 medial to the calcar, pushing the femur laterally. Place retractor #7 posterior to the greater trochanter Figure 21. Release the capsular insertion from the greater trochanter from anterior to posterior. Place the operative leg under the nonoperative leg in a lazy figure of four position Figure 22. Apply moderate anterior retraction to the femoral hook (retractor #5) by turning the crank on the table assembly.
With the proximal femur now mobilized anteriorly it can be easily broached Figure 23. Once the templated size is reached, release the hook from the table assembly and do a trial reduction Figure 24 and Figure 25. Leave the femoral hook (retractor #5) in place around the proximal femur. Check the femoral component fit on fluoroscopy. A big advantage of the Innomed Das/Seng anterior approach hip instrument system over a special traction table is that you can now measure the leg lengths directly Figure 26. Verify that the femoral component fit is good and that the hip is stable. Then dislocate the hip. Reattach the femoral hook (retractor #5) to the table assembly. Turn the crank for anterior retraction adequate for removal of the trial broach and insertion of the femoral component Figure 27. Release the anterior retraction on the table assembly. Remove the femoral hook (retractor #5). Apply the femoral head to the femoral stem trunion Figure 28. Reduce the hip. Check leg lengths. Level out the table. Close the fascia over the TFL. Close the subcutaneous fascia and skin.

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# Das/Seng Anterior Total Hip Instruments

Designed by Amal Das, MD and Brian Seng, DO

Retractor set with included table-mounted, controlled-release ratcheting elevator hook, specifically designed to help simplify anterior approach total hip arthroplasty

## PRODUCT NO'S:

<table>
<thead>
<tr>
<th>Product No</th>
<th>Description</th>
<th>Blade Width</th>
<th>Blade Depth</th>
<th>Overall Length</th>
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<tr>
<td>6221</td>
<td>[1 - Posterior Femoral Neck Retractor]</td>
<td>25 mm</td>
<td>3&quot; (7.6 cm)</td>
<td>14&quot; (35.6 cm)</td>
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<td>6222</td>
<td>[2 - Anterior Femoral Neck Retractor]</td>
<td>31.5 mm, 10 mm @ Tip</td>
<td>4.5&quot; (10.2 cm)</td>
<td>15&quot; (38.1 cm)</td>
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<td>[3 - Anterior Acetabular Retractor]</td>
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<td>16&quot; (40.6 cm)</td>
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<td>6224</td>
<td>[4 - Posterior Acetabular Retractor]</td>
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<td>6227</td>
<td>[5 - Femoral Calcar Retractor]</td>
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<td>[6 - Greater Trochanter Retractor]</td>
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<td>14.875&quot; (37.8 cm)</td>
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<tr>
<td>6226-RH</td>
<td>[7 - Round Elevator Hook]</td>
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<td>9.25&quot; (23.5 cm)</td>
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<td>6226-EH</td>
<td>[8 - Flat Elevator Hook]</td>
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<td>5.75&quot; (14.6 cm)</td>
<td>9.25&quot; (23.5 cm)</td>
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## Optional Instruments:

- This product number includes one 6226-RH Elevator Hook
- Folds to approx: 21" x 5" x 5" (53.4 cm x 12.7 cm x 12.7 cm)

- Lit. Number: IN-12-01, v4
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