DIRECT ANTERIOR APPROACH

Guide for use with the Furlong Evolution Femoral Stem & CSF Plus Acetabular Cup







ORTO PEDI



Contents

Introduction	2
Patient set up	3
Capsulotomy	5
Femoral elevation and capsule release	6
Preparation of acetabular	8
Cup insertion	9
Preparation of femur	10
Trialling	13



Introduction



Direct Anterior Approach (DAA) has gained in popularity as a minimal invasive surgical technique associated with reduced muscle damage, reduced pain, and therefore an enhanced patient recovery (1). Here we give guidance on using our DAA instruments with our Furlong Evolution femoral stem and our CSF Plus acetabular cup. However, the technique can equally be used with our Avanteon cemented stem.

Please note:

Surgeons wishing to begin using the Direct Anterior Approach (DAA) with the Furlong Evolution stem and CSF Cup should either;

- 1) Already have experience of implanting the Furlong Evolution and CSF cup through a conventional approach,
- 2) Or should be fully competent in DAA with a different implant.

It is recommended that surgeons should gain experience of Furlong Evolution through their normal approach first before attempting it via a DAA for the first time. JRI Orthopaedics run regular cadaver lab courses and can arrange for in-theatre observations or assistance with an experienced Evolution/DAA surgeon.

It is not recommended that the surgeon combine the use of a new implant with a new approach as the risk of complications will be significantly increased.

The technique described is DAA with capsular preservation, without the use of a traction table.

This guide is intended to be used in addition to the Furlong Evolution Operative Technique. It should also be noted that the retractors shown in this technique description are those supplied in the Furlong Evolution DAA Instrument Set. These are recommendations only and retractor selection and positioning is at the discretion of the operating surgeon.









Patient Positioning

Place the patient in a supine position on the operating table to create a predictable and stable pelvis position. For adequate femoral exposure, the hip will need to be adducted and extended. Using an operating table which allows the foot of the table to be dropped will greatly facilitate this.

Skin incision location and size

Begin an incision two finger breadths lateral (~ 3 cm) and one to two finger breadths distal to the ASIS and extend it distally.

Keep the initial incision small (8-10 cm) and extend as needed.

Location of tensor fascia latae (TFL), incision and dissection of the fascia

Incise the fascia over the TFL lateral to its edge. Bluntly dissect the muscle fibres from the fascia. Retract TFL laterally and rectus femoris medially. Ref. *Image 1*.





Identify the ascending branches of the lateral circumflex vessels and cauterize or ligate, and divide.

Once the vessels are controlled, clear fat and soft tissue from the surface of the hip joint capsule. Develop the interval between the capsule and gluteus minimus at the superior femoral neck. Develop the soft tissue plane medially over the capsule of the inferior femoral neck. Elevate the iliocapsularis and iliopsoas and place a retractor under these, over the pelvic brim medial to the anterior inferior iliac spine (AIIS). Retractors 10-51-57, 10-51-58 would be suitable for this. Ref. *Image 2 and image 3*.







Insert the retractors superiorly and inferiorly over the femoral neck. Incise the capsule in line with the axis of the femoral neck, retaining medial and lateral capsular flaps. Ref. *Image 4.*

Reposition the supero-lateral and infero-medial retractors inside the capsule. Ref. Image 5.

Tip: It can be helpful to make the longitudinal capsular incision more lateral and make a transverse incision following the anterior wall of the acetabulum proximally and an inferior incision following the intertrochanteric line distally.

Removal of the Femoral Head

Carefully clear the "saddle" region between greater trochanter and the neck as this serves as the starting point for the neck osteotomy. When the capsule has been prepared for femoral neck osteotomy the surgeon should have a clear view of the supero-lateral acetabulum and the saddle.

Femoral Elevation: Inferior Capsular Release



Divide the femoral neck with the aid of the femoral neck resection guide and according to preoperative planning. Ref. *Image 6.*

Insert the "cork screw" into the femoral head and remove the head taking care to protect the Tensor Fascia Lata muscle (TFL). Ref. *Image 7.*

Tip: Sometimes this is made easier by creating a double osteotomy of the neck, with both cuts parallel, so that a disc of the femoral neck can be removed to improve access.

Femoral Elevation: Inferior Capsular Release

Put the leg in the figure 4 position and release the pubo-femoral ligament (medial capsule) down to the lesser trochanter. Measure the distance from the lesser trochanter to the calcar cut to confirm that this is as per the pre-operative plan.







Femoral Elevation: Superior Capsular Release

Put the leg back into the neutral position and insert a blunt bone hook into the femur at the level of the calcar. Retract gluteus medius and minimus from the capsule and perform a release while pulling the femur anteriorly and laterally with the bone hook (ref. 5195), releasing the capsule starting with the tip of the Bovey perpendicular to the inner surface of the greater trochanter at the middle of the neck and moving the tip in the superior direction. The posterior cortex is the most posterior limit of the release.

Acetabular Exposure

Place a double pronged retractor (ref. 10-51-40) at the level of the posterior rim of the acetabulum. Retract the posterior inferior capsule to obtain a view of the transverse acetabular ligament (TAL). Place a retractor at the level of the posterior inferior part of the acetabulum, between the rim and the capsule exactly at the level of the ischium. A further retractor is placed anteriorly and a fourth retractor may be placed superior anteriorly to enhance exposure. Ref. *Image 8.*





Image 10



Image 11

Preparation of the Acetabulum

Remove the residual acetabular labrum. Ref. Image 9.

Use an Offset Reamer Handle to avoid impingement with lateral tissue and excessive force against the anterior acetabular wall. Start with the smallest acetabular reamer and medialise first. After that, orientate the reamer in the correct inclination and anteversion and continue reaming in accordance with intended planned acetabular implant size. Use care introducing and removing the reamers. Ref. *Image 10*.

Note: The CSF Plus is a hemispherical cup, and is designed to be a mean average of 4% larger than the reamer size. This gives equatorial interference fit when impacted into the acetabulum. Maintain concentricity within the acetabular cavity during reaming and aim for a line to line sizing but adjust dependent on the bone quality, if unsure, over ream by 1mm or 2mm.

As an alternative, introduce the reamer into the surgical site by hand and then attach the reamer handle. After reaming, detach the reamer from the reamer handle and remove the reamer handle and reamer separately. Ref. *Image 11*.







Image 13

Insert the cup into the surgical site by hand. Attach the impactor (ref. 86-99-44), and adjust final orientation before impacting the cup. Ref. *Image 12.*

Alternatively, insert the cup using the curved cup introducer handle (ref: 86-11-05) impactor, positioning the cup on the impactor so that any screw holes are oriented as desired. Ref. *Image 13.*

Impact the CSF Plus cup in accordance with the CSF Plus operative technique. Avoid misdirected or excessive force.

Screw Insertion

If screw fixation is desired, use a flexible drill and drill guide, following the respective protocol for the implanted CSF Plus acetabular component.



Liner Insertion

Insert the appropriate liner (Ceramic or polyethylene) and seat it using the CSF Plus liner impactor as per operative techinque.





Place a double pronged retractor underneath the superior aspect of the greater trochanter, in front of gluteus minimus. Place a retractor medial in the calcar region, proximal to the iliopsoas tendon. If desired, place a further retractor laterally at the proximal femur.

Place the Bone Hook inside the calcar region of the resected neck and slowly elevate the femur anterolaterally, placing the leg in the figure 4 position. Ref. *Image 14.*

Tip: Always combine pulling on the bone hook and levering of the retractor to minimize forces to the greater trochanter.

The hip needs to be adducted and extended. Ability to drop the foot of the table will be helpful.





Opening the Femoral Canal

Use a gouge, then the Modular Box chisel from the Furlong Evolution set, to remove bone in the supero-lateral region of the neck. This step helps minimize undersizing and varus positioning of the femoral broach and stem. Carefully open up the canal with the curved canal finder (450-06-01/02 Ref. *Image 15*) or a curved curette then "sound" the direction of the canal with a tapered reamer (canal finder).



Broaching the Femur

Begin with short size 6 broach. Attach it to the Dual-Offset Handle (450-14-02/01) and push it into the canal. Use care to align the broach with the intended version.

Only after the broach is fully introduced, begin light impaction with a mallet. Visually check for varus/valgus alignment cues such as the orientation of the handle.



Progress through the available broach sizes until the desired implant size is reached. Only the last 10 – 20mm of insertion of the broaches should be performed with the mallet. To reduce the risk of damage to the calcar, care should be taken to gently and repeatedly hammer the broach in and out. Use lateral and posterior pressure on the broach handle to ensure neutral stem position. The handle of the broach can be used as a 'torque wrench' to ensure broach stability at the final size. Move the handle anteriorly and posteriorly to check anterior / posterior stability. When movement only occurs between the handle and the broach, not between broach and bone, the broach is correctly sized. The proximal etched line indicates the 'stop' point of the broach. This line should be visible above the resection line medially. Ref. *Image 16.*

NB. if pre-operative planning indicates an acute neck resection angle it is possible the entire line might not be visible.





Having broached up to the desired implant size and having ensured the broach is stable at the level of the calcar cut, detach the broach handle from the broach and insert the plastic, colour coded trial neck of the pre-templated neck angle and offset. Ref. *Image 17.*



Attach the appropriate trial head as templated during pre-operative planning. A choice of four neck lengths are available: Short (-4mm), Medium (0mm), Long (+4mm) and X-Long (+8mm). Select the head diameter size which matches the chosen acetabular cup/liner I.D. Size. Reduce the hip. Level the table and check for stability, range of motion and soft tissue tension and leg length.

Tip: It may be useful at this stage to have a check X-Ray, with the trials in place, to check alignment, leg length and offset.

Following the trial reduction, re-assess stability of the broach by re-attaching the broach handle and twisting and levering up and down. If there is movement between the broach and bone, go up one size.

Stem Insertion

Select the definitive stem of the size, neck angle and offset as confirmed in the trialling stage. It is advisable to insert the definitive femoral stem as far as possible by hand (within 10mm of the final position) as this gives greater control over the version and alignment of the stem. Ref. *Image 18.*





The stem introducer is then located into the hole on the shoulder of the definitive implant. Final impaction can be achieved with the aid of light tapping on the stem introducer, using a mallet, with slight bias holding the handle posteriorly and laterally. Ref. *Image 19.*

A duller tone is a sign, during impaction a change in the tone of the hammer strike is an indication that the stem is fully seated. It normally changes to a more duller tone, when fully seated.

N.B. If using a collared stem option, the collar is designed to sit 1mm off the calcar. A change in tone will indicate when the stem is fully seated. At this point the stem should be checked for stability. If the stem is stable, no further impaction should be carried out in an attempt to seat the collar on the calcar.

N.B. If using a collarless stem, final seating is achieved when the Hydroxyapatite ceramic coating is in line with the neck resection. The note may change to a duller tone just before this point is reached. If the stem is stable no further impaction should be carried out.







Once the stem is fully inserted, the taper protector is removed. A final trial reduction may be performed to confirm joint stability and range of motion.

The definitive femoral head with the desired neck length is placed carefully onto the clean taper of the femoral stem using a twisting motion. Using a firm tap, impact the definitive femoral head using the head impactor, ensuring the surface of the head is not scratched or damaged in any way.

The hip is reduced and range of motion, joint stability and leg length are re-checked.

The wound is closed according to surgeon preference.

1.Post, Zachary D., MD, Orozco, Fabio, MD, Diaz-Ledezma, Claudio, MD, Hozack, William J., MD, Ong, Alvin, MD 2014© Journal of the American Academy of Orthopaedic Surgeons



	PART NUMBER	DESCRIPTION
	450-14-01	Double Offset Broach Handle (Left)
The second secon	450-14-02	Double Offset Broach Handle (Right)
	450-06-01	Femoral Canal Finder LH
	450-06-02	Femoral Canal Finder RH
00	10-51-40L	Retractor Blunt 24 x 320mm
00	10-51-57	Retractor Double Angled 20 x 310mm
00	10-51-58	Retractor Double Angled 25 x 310mm
	86-11-05	Curved Cup Introducer Handle (Incipio)
	86-99-14	MIS Cup Holder and Impactor

P

FURLONG EVOLUTION

16



	PART NUMBER	DESCRIPTION
<u>co</u>	10-51-72	Trochanter Lever 30 x 330mm 40°
	10-51-73	Curved Hohmann 22 x 240mm
	10-51-90	Pelvic Lever 26 x 330mm
	10-54-51S	Retractor Kocher 40 x 25mm
	10-54-52S	Retractor Kocher 70 x 25mm
	5195	Bone Hook
	10-06-00	MIS Reamer Handle





JRI Orthopaedics is different from the other global corporations which operate in the Orthopaedic implant market. One aspect that makes us unique is that JRI is wholly owned by Orthopaedic Research UK (ORUK), a charitable organisation whose vision is to eliminate bone and joint disease.

Mr Ronald Furlong FRCS, an eminent consultant orthopaedic surgeon who founded JRI, established ORUK in 1989. Since then, JRI Orthopaedics has gift aided each year its entire profits, after operational cost, to ORUK. This money is put to use in funding high quality research and clinician education programmes throughout the U.K.



JRI Cumulative Gift Aid Donations to ORUK



Go to www.jri-ltd.com or simply scan the QR code with your smartphone

ORTO

PEDI







JRI Orthopaedics Ltd. 18 Churchill Way, 35A Business Park, Chapeltown, Sheffield S35 2PY T: 0114 345 0000 F: 0114 345 0004 W: www.jri-ltd.com

JRI Orthopaedics is wholly owned by Orthopaedic Research UK