access

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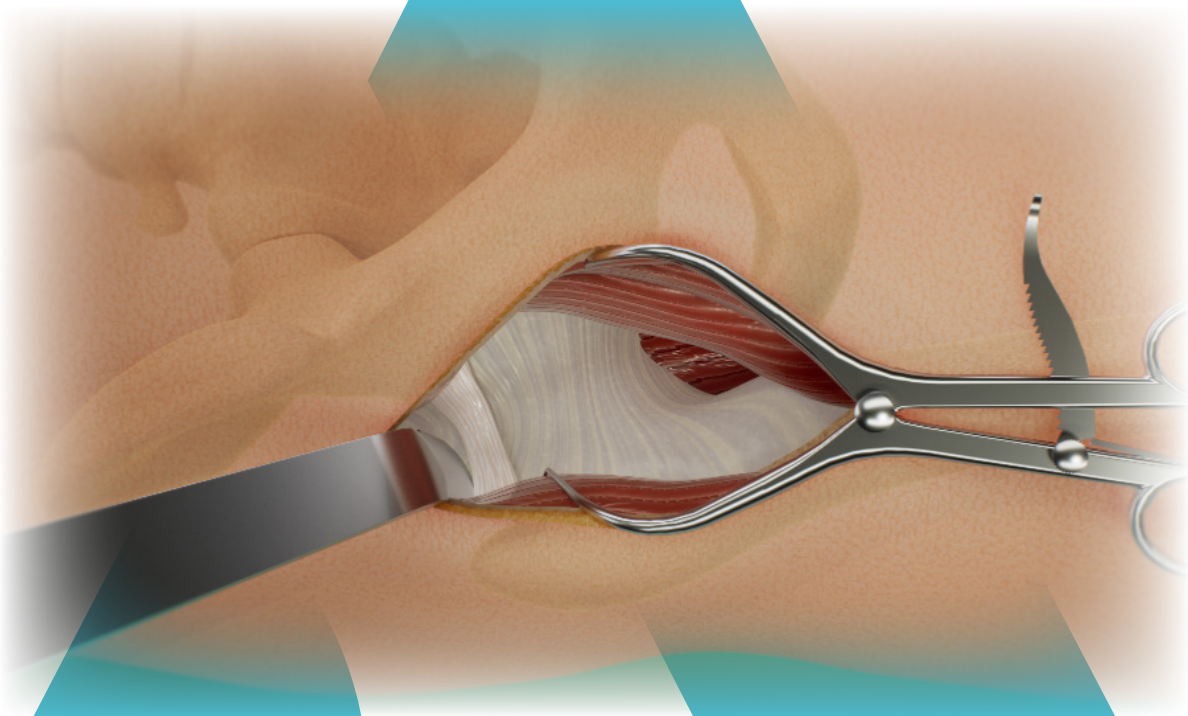


Surgical Technique
Anterior Approach Off Table

Summary

Introduction

Direct Anterior Approach

Direct anterior approach is one of the possible ways to access hip joint during a hip arthroplasty. It has been gaining popularity in recent years as it is a conservative approach: it is the only approach performed in both intermuscular and interneural planes *(Figure 1)*.

Anterior approach off table allows a good acetabular visibility, and an easy check of leg length.

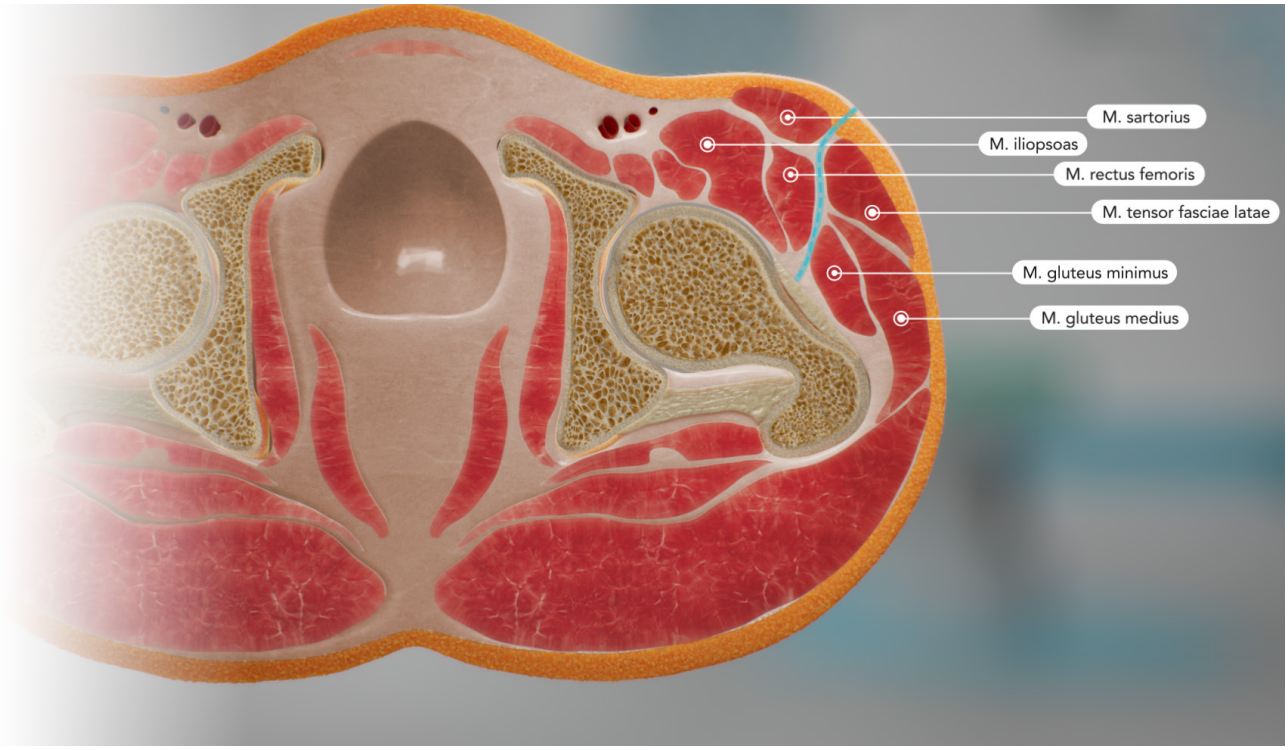


Figure 1

REMINDER

This current surgical technique is intended to present one possible technique (from Dr. Chatellard). Other variations are also possible.

NOTA

Anterior approach can be performed with or without the use of an extension orthopaedic table. The purpose of this surgical technique description is to provide instructions on how to use the instrumentation properly. The surgeon is fully responsible for choosing and performing the approach and surgical technique.

1 Patient installation and Planning

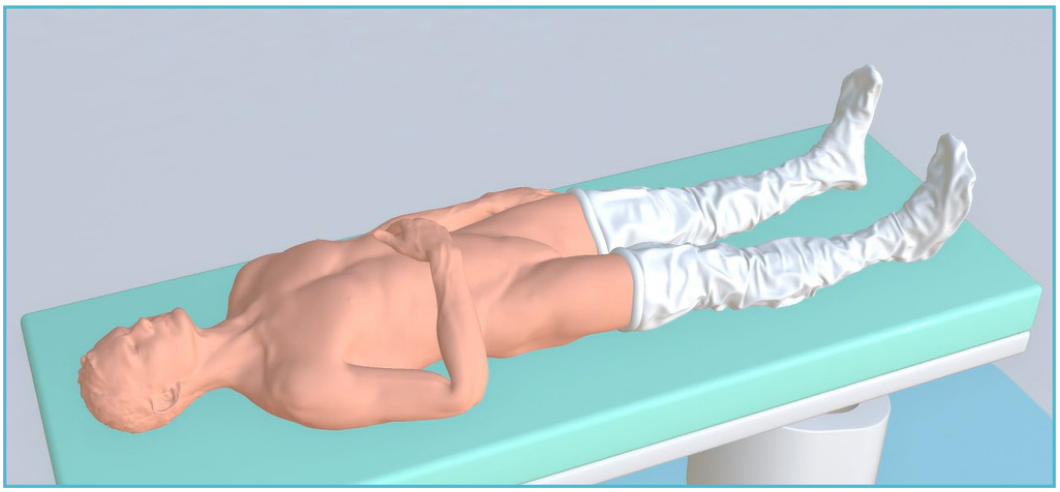


Figure 2

Patient selection for anterior hip surgery is based on the suregon's preferences, presence of prior incisions, obesity level, risk of dislocation and degree of deformity among others factors.

Patient is positioned supine, on a standard operating table.

Both legs should be drapped free *(Figure 2)*. This will not only allow independent handling during femoral preparation to place them in «Position 4», but also ease leg length monitoring during the procedure.

In case of obese patients, fat that folds over the iliac crest should be retracted with adhesive tapes.

Surgical planning should be made pre-operatively with dedicated implants' templates, to determine:

- Hip centre of rotation
- Size and orientation of implants
- Level of femoral neck cut with regard to reliable anatomical landmark

NOTA

For all implants, the provided templates have a 115% scale, but are also available with other scaling upon request or in digital version.

2 Incision

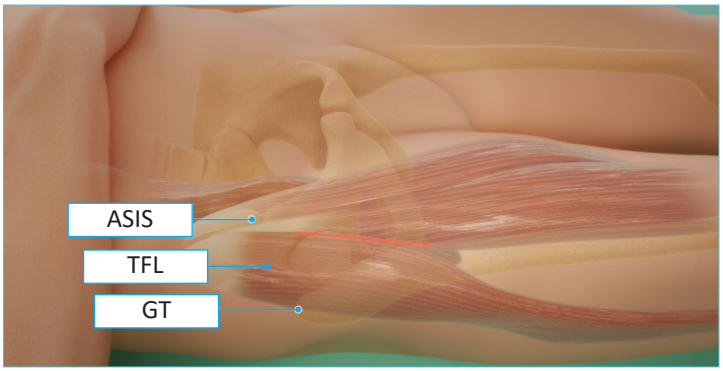


Figure 3

Skin Incision

Identify the anterior superior iliac spine (ASIS) and greater trochanter (GT) by palpation.

The incision starts two fingers laterally and below the ASIS. Greater trochanter should be located at the centre, and incision should be made in the femoral shaft axis *(Figure 3)*.

Length of the incision should be about 6 to 10 cm, depending on the patient.

Subcutaneous Incision

Incise the subcutaneous tissue until you see the tensor of fascia lata (TFL) aponevrosis. This step must be performed very carefully to ensure not injuring the lateral femoral cutaneous nerve. If any branche of lateral femoral nerve is visible in the subcutaneous fat, it should be retracted anteriorly.

Sharply incise around the TFL in the same orientation as previously made. Place the Gelpi clamp as in figure 4 to retract the muscle laterally. Once fascia is incised, a blunt finger pressure will allow to identify and develop the intermuscular plane between fascia (lateral side) and rectus femoris / satorius (medial side). The anterior branch of circumflex artery is identified and cauterized.

Gelpi clamp is then repositioned to see deeper in the joint, and a Hohmann retractor double bent is placed proximally, behind the femoral neck laterally, under the greater trochanter, to help avoiding any injury to femoral nerve and vessels *(Figure 5)*.

Fibers of rectus femoris attached to the anterior hip capsule are dissected using a scalpel. There is then a direct view on the hip joint capsule.

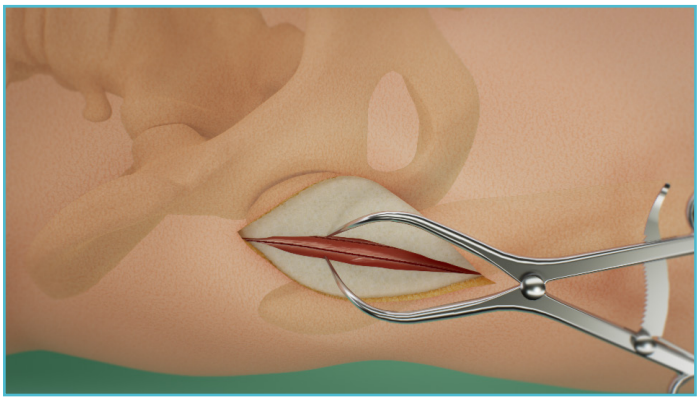


Figure 4

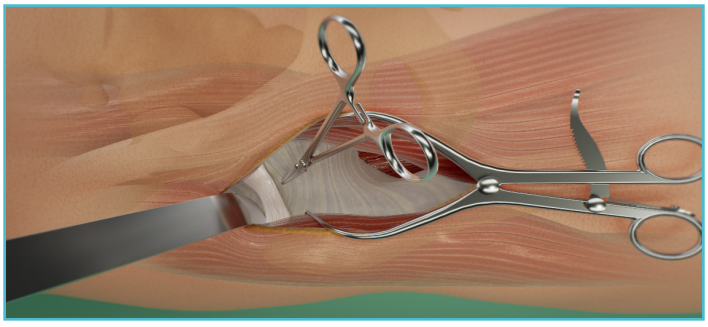


Figure 5

3 Incision (following)

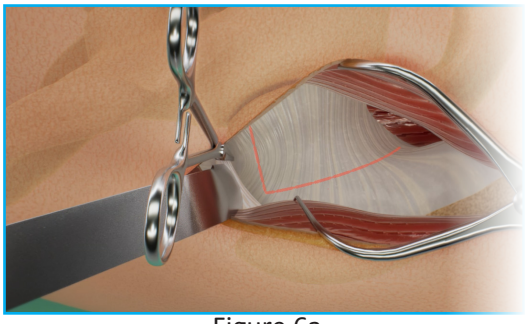


Figure 6a

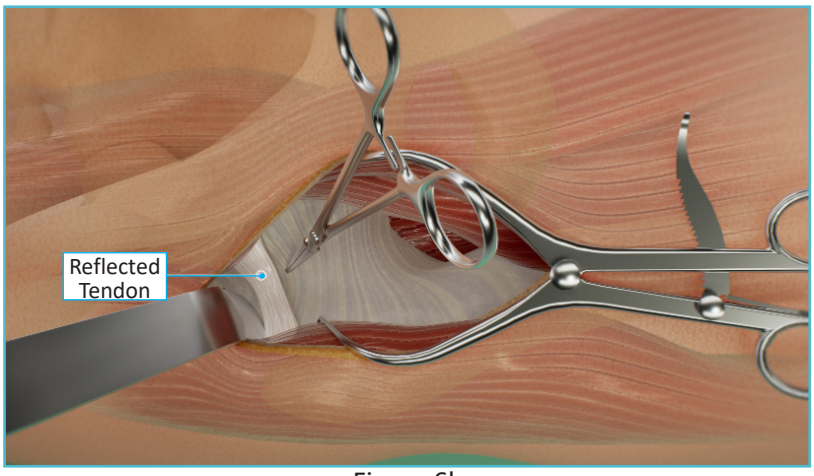


Figure 6b

Capsule incision

In order to have a good capsule exposure, the Hohmann double bent retractor is repositioned deeper, and the Gelpi clamp is repositionned deeper distally. A second Hohmann double bent retractor is placed at medial proximal aspect. A Kocher plier can be placed to protect reflected tendon if needed.

Capsule is incised in L shape, and incision extends proximally up to the reflected tendon, which is a limit of incision for anterior capsule *(Figures 6 a and b)*. This incision gives the capsule the shape of an anterior flap on which the instruments will rest. Attach the two parts on two tracting wires *(Figure 7)*.

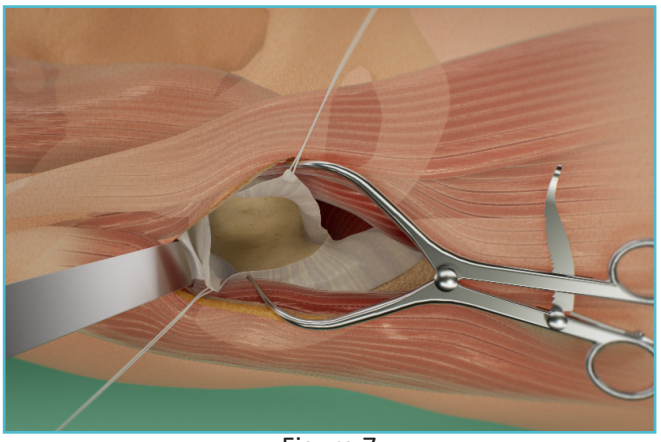


Figure 7

4 Femoral Neck Cut

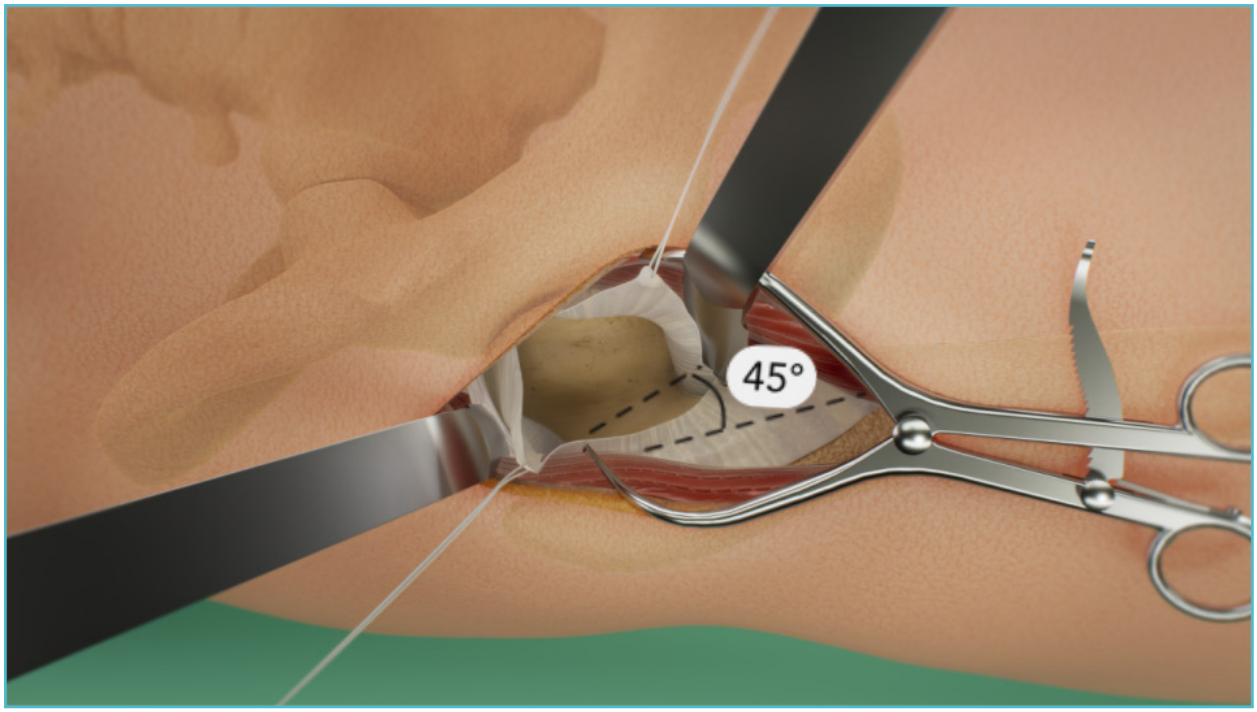


Figure 8

The level of femoral neck cut is defined during pre-operative planning step, thanks to reliable anatomical landmarks (greater trochanter, lesser trochanter, trochanteric fossa).

Leave the Gelpi clamp in place. Position the two Hohmann double bent retractors medially and laterallly to the femoral neck *(Figure 8)*. The proximal edge of the plate on the Hohmann medial retractor will serve as a reference for the femoral cut level. Perform the osteotomy at 45° from femoral axis.

Remove the Hohmann retractors, then place a corkscrew in the femoral head and spin it to rupture the ligament. Extract the native femoral head *(Figure 9)*.

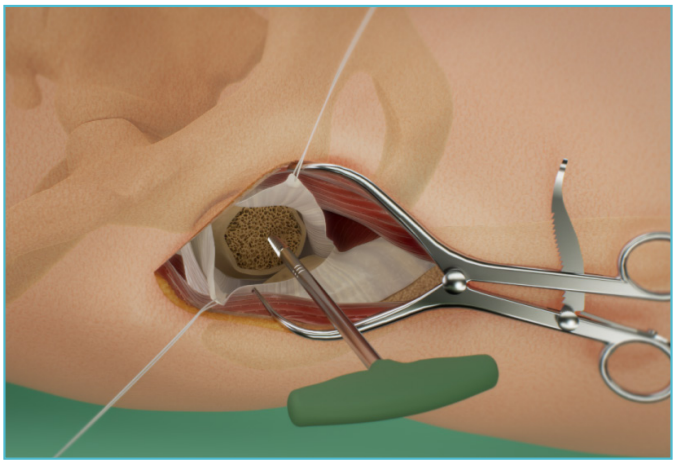


Figure 9

NOTA

It is possible to perform the main cut first, and then a second separate parallel cut 5mm proximally. Remove the slice, this will leave more space to place the corkscrew.

5 Acetabular Exposure

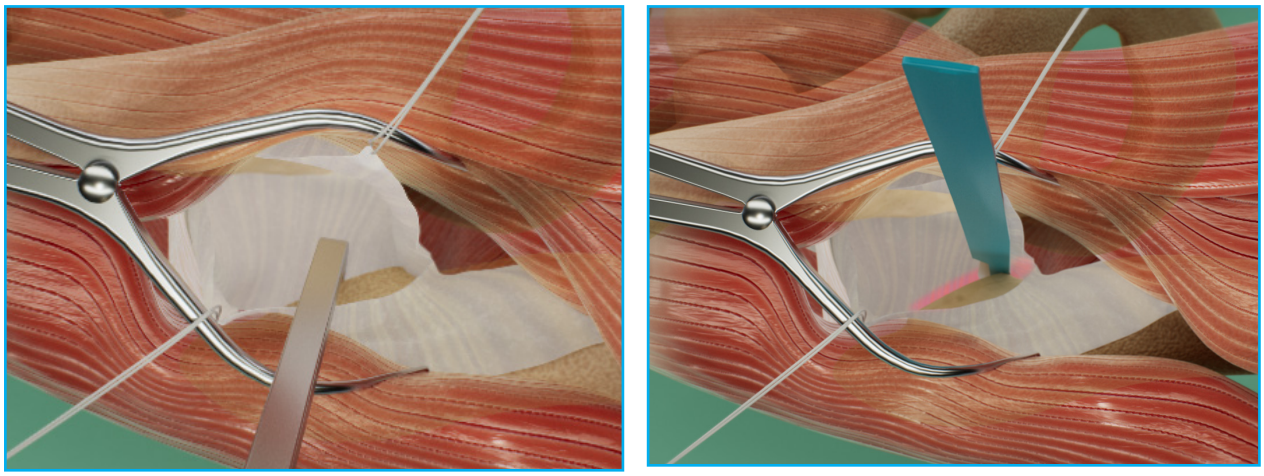


Figure 10

Slightly rotate the leg externally. Position the Gelpi clamp at femoral neck cut level, with the handle in proximal direction, to retract Fascia Lata tensor and rectus femoris muscles. Capsule releases will be performed at this stage.

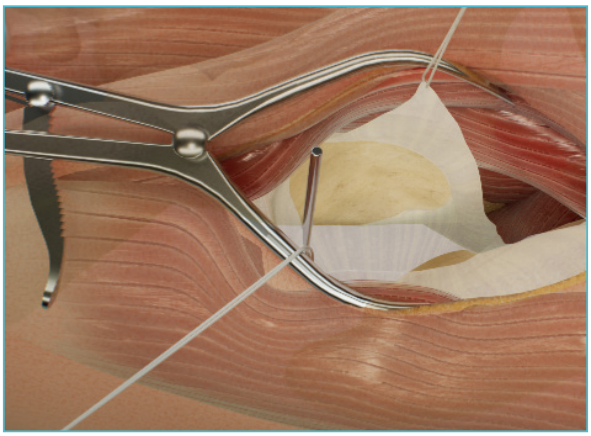
Inferior capsule release:

Perform inferior capsule release with the scalpel, from femoral neck cut level to the lesser trochanter. This release is of major importance, as it will later help femur elevation.

Superior capsule release:

Superior capsule release should be made very carefully: it is complete once the fatpad between Greater Trochanter and Gluteus minimus is visible.

Put the leg in neutral position. Thanks to the Lambotte hook, apply some lateral and superior traction to the femur, in order to put tension in the pelvitrochanteric muscles *(Figure 10)*. Scalpel should be straight in proximal direction, over greater trochanter. Open the space by finger pressure.



6 Acetabular preparation

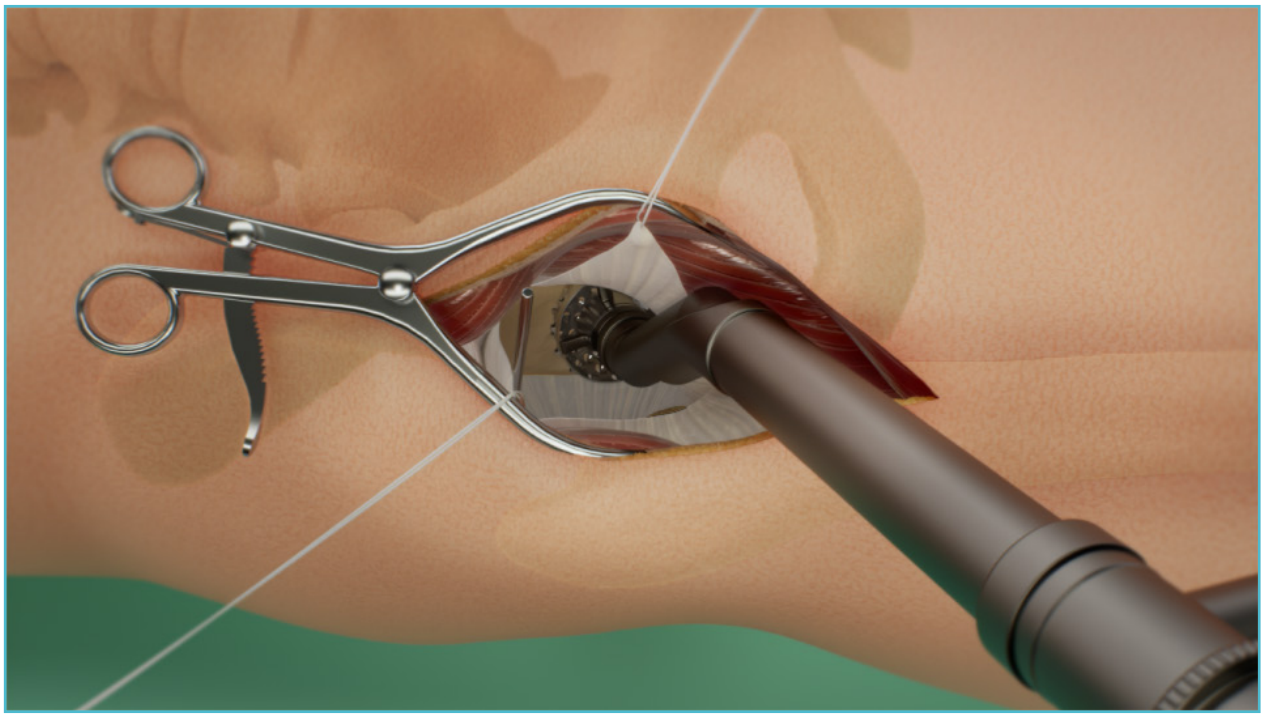


Figure 11

Keep Gelpi clamp in place, and place a Steinmann pin in equatorial part of the acetabulum *(Figure 11)*, next to the reflected tendon, in order to keep good visibility.

Remove any central osteophytes using resection forceps. This step will ensure that the small reamers remain stable and do not slip anteriorly or posteriorly.

Carry out the acetabular preparation according to the recommendations of the surgical technique dedicated to the planned implant. It is recommended to use an offset reamer handle for reaming step.

With patient in supine position, for trials and impaction steps, the alignment guide should point perpendicular to the ceiling to achieve a 45° inclination.

NOTA

It is possible to use the reamer handle with the associated reamers in the conventional way, or to use a reamer handle in the disengaged position, and place/remove the reamers manually from the acetabulum.

7 Femoral Exposure

Figure 12

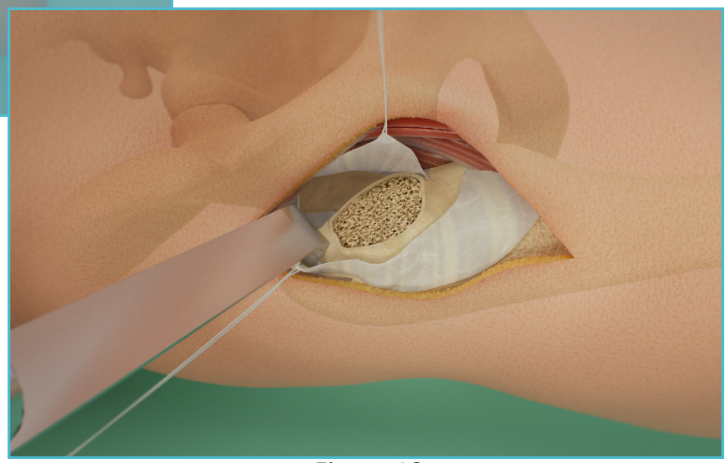


Figure 13

Ensure posterior release has been adequately performed previously.

Place the operated leg in a figure-four position (*Figure 12)*, under the opposite leg: turn the patient foot at 90° external rotation, then move the leg in adduction under the controlateral leg (at least 20-30° adduction). This position provides anteversion to the operated femur, and good exposition.

Use a double-pronged femoral elevator posterior to the tip of the Greater Trochanter. Progressively lift the femur, until good femoral exposure is achieved *(Figure 13)*: femoral canal should be easily visible through incision. Replace the femoral elevator between Greater Trochanter and abductor muscles to protect them. A double bent Hohmann retractor is placed medially, along the posterior wall of neck.

If lifting is complicated, posterior capsule release should be made once again, especially in the region of Piriformis fossa.

NOTA

Femoral canal preparation should not start until the femoral canal is accessible directly easily, otherwise there is a risk of fracture of greater trochanter

8 Femoral Preparation

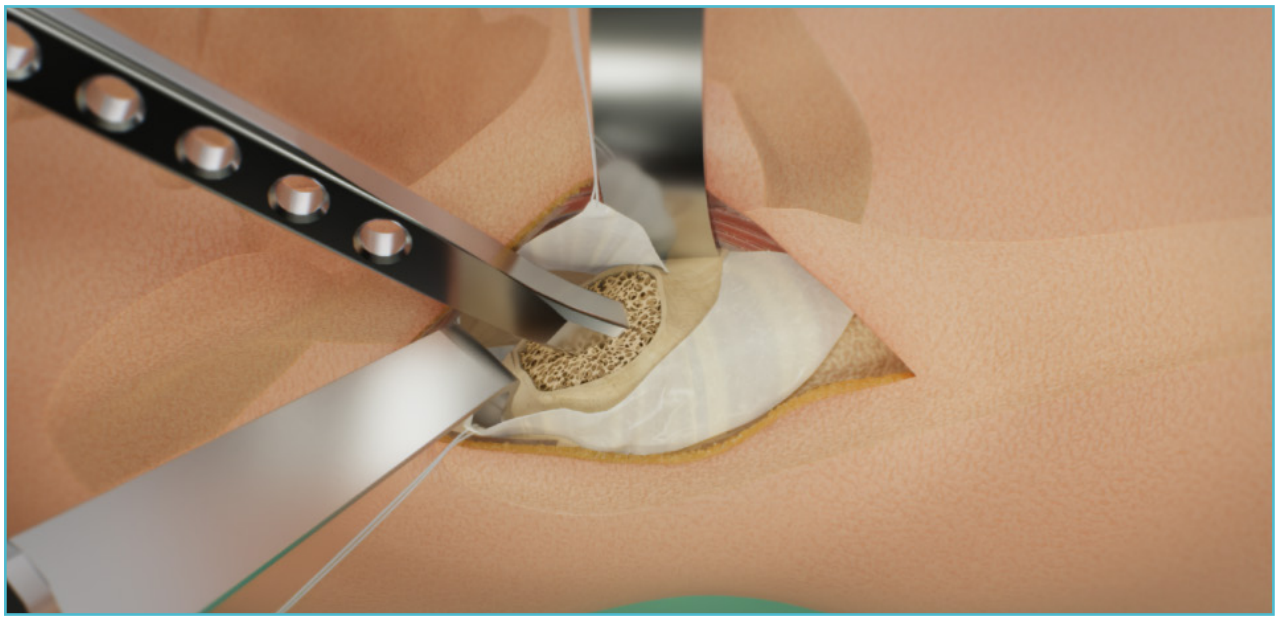


Figure 14

Depending on preference, the femoral canal is opened using a chisel, a curette or a starter broach *(Figure 14)*.

The femoral preparation is performed according to the surgical technique dedicated to the selected implant.

Amplitude provides several broach handles options, in order to cover all surgical approaches during broaching step. In this surgical technique, it is recommended to use either a double offset broach handle, or straight anterior broach handle, depending on the surgeon's preference.

Stop broaching once axial and rotational stability are achieved. If the final size of broach differs significantly from planned implant size, this may mean the broach is in varus position.

9 Trials, Reduction and closure

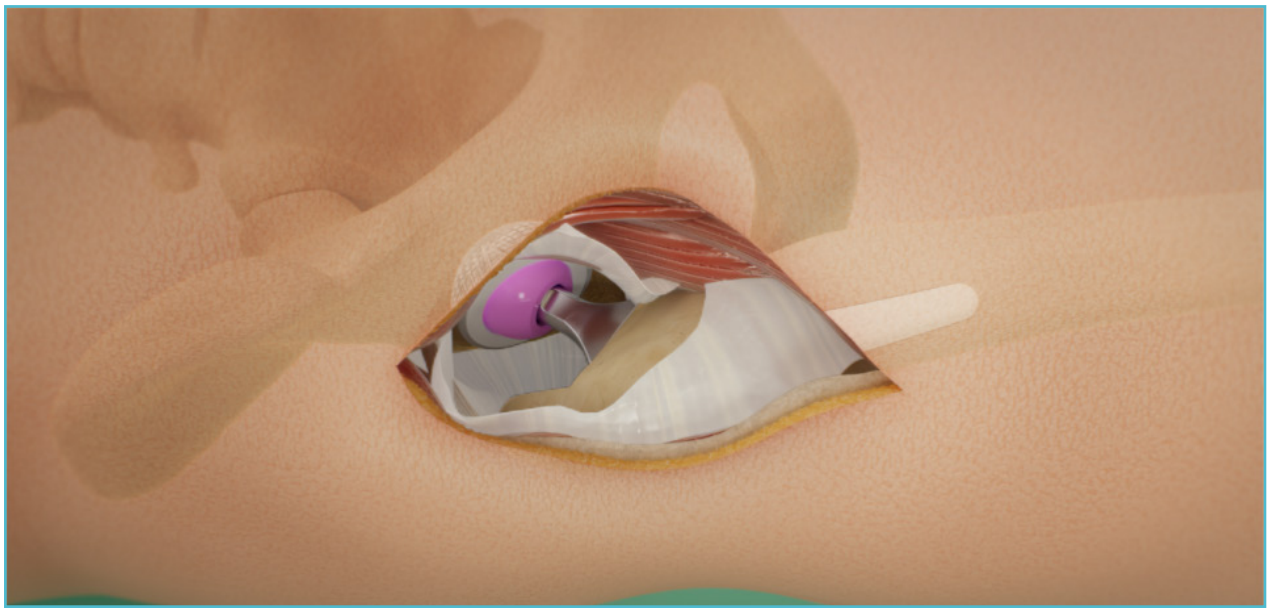


Figure 15

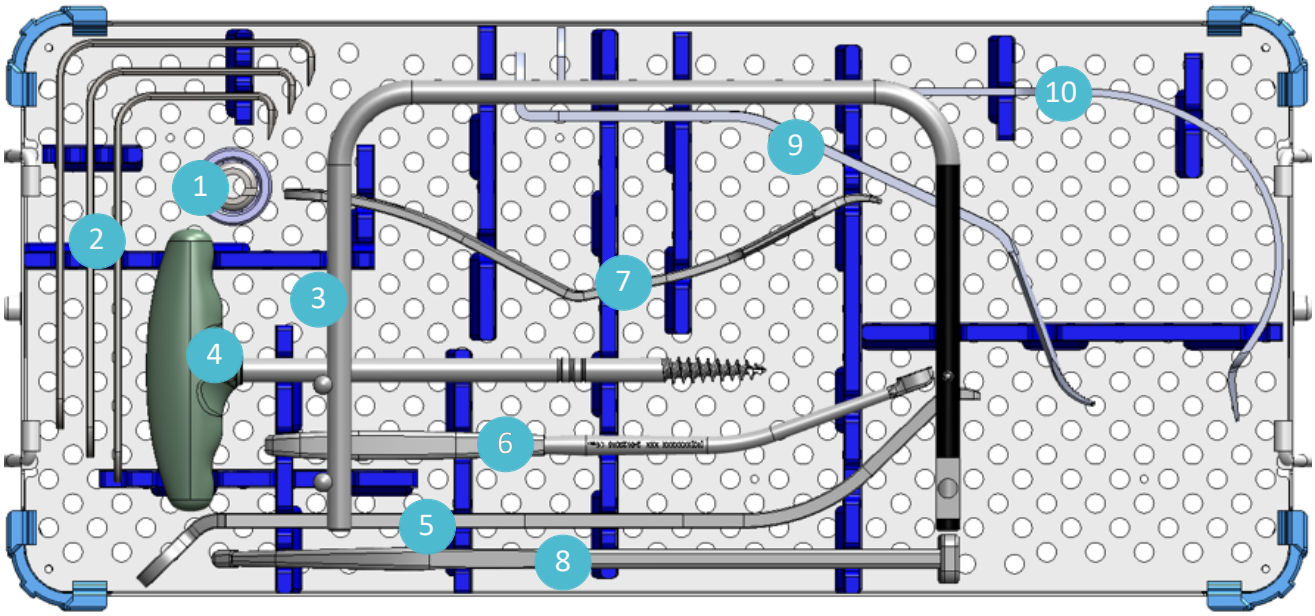
Once final cup and stem have been implanted, perform last trials in reduction to check stability, mobility and leg length. Once settings are satisfying, implant the final head and reduce the joint.

Capsule is put back at its place and sutured.

Wound is closed. There is no need for suturing the muscles, they come back to their original place once all retractors are removed. Subcutaneous tissue and skin are closed, taking care not to injure lateral femoral nerve.

Instrumentation

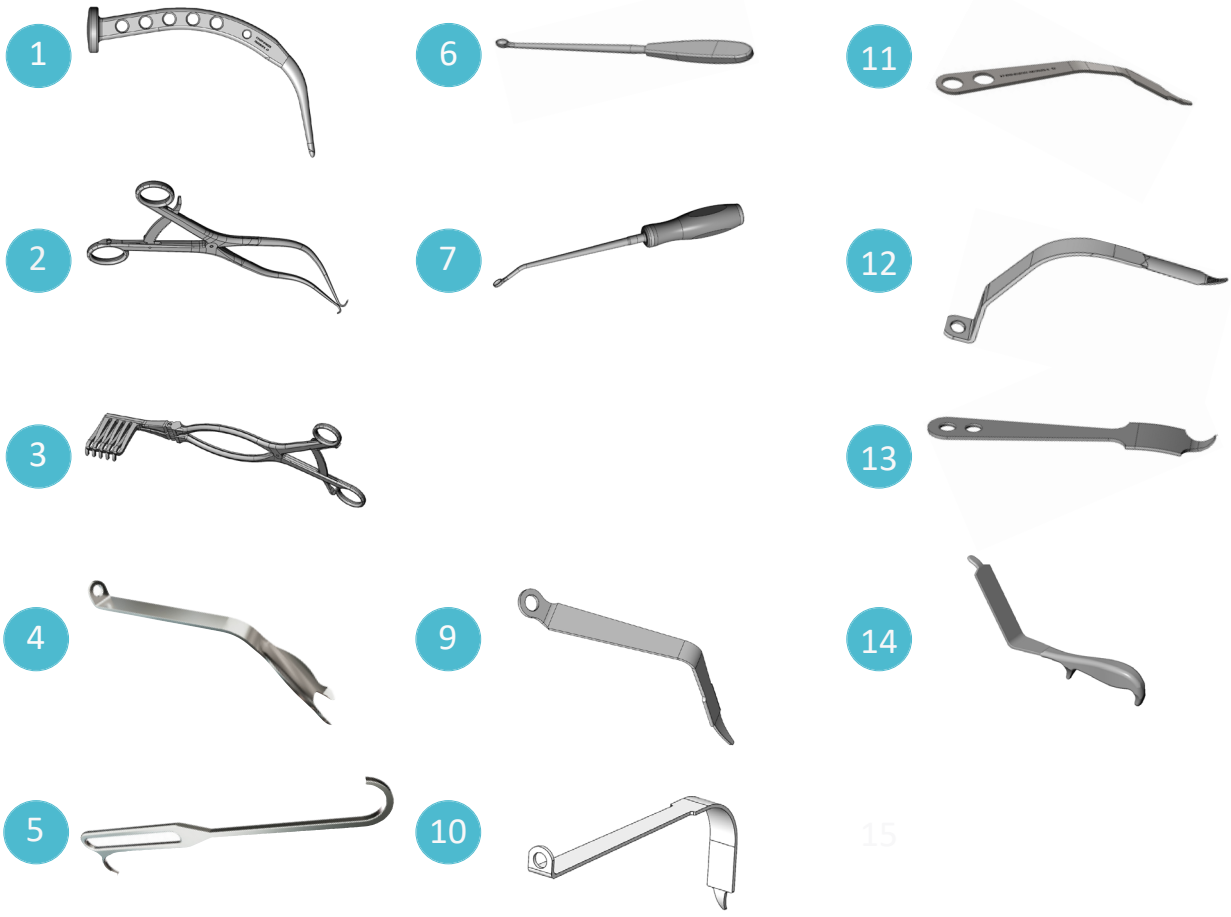
Access Retractors Set



Rep	Description	Reference	Qty
1	Valve fixation ring	2-0120700	1
2	Valve length 60 for Charnley Retractor frame	2-0122906	1
2	Valve length 80 for Charnley Retractor frame	2-0122908	1
2	Valve length 100 for Charnley Retractor frame	2-0122910	1
3	Charnley Retractor frame	2-0199100	1
4	Femoral Head Remover	2-0120012	1
5	Femoral Neck Elevator - Mueller Type - 330mm	2-0120011	1
6	Bent Bone Curette Concave - 20°	2-0120015	1
7	Bent Curved Hohmann Retractor	2-0120005	1
8	Femoral starter for anterior approach	2-0194800	1
9	Hohmann retractor Double bent - Narrow - 270mm	2-0120003	1
10	Curved Hohmann Retractor - Cobra type - 300mm	2-0120002	1

Instrumentation

Other Retractors available (Optional)



Item	Description	Reference
1	Femoral Preparation Starter Broach	2-0199300
2	Gelpi Clamp	2-0120014
3	Beckmann Retractor - 30 cm - 50 mm Teeth	2-0120013
4	Femoral Neck Elevator - Mueller type - 270mm	2-0120010
5	Lambotte Hook - 260 mm	2-0120009
6	Straight Bone Curette	2-0120016
7	Front Bone Curette	2-0120017
8	MIS retractor	2-0120018
9	Curved Hohmann Retractor - Cobra type - 270 mm	2-0120001
10	Dual curvature Hohmann retractors	2-0199200
11	Bent Hohmann Retractor - Narrow - 210 mm	2-0120004
12	Bent Hohmann - Narrow - L Shape - 200mm	2-0120006
13	Verbrugge Muller Retractor - 240 mm	2-0120007
14	Merle d'Aubigné Retractor - 90x30 mm	2-0120008

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