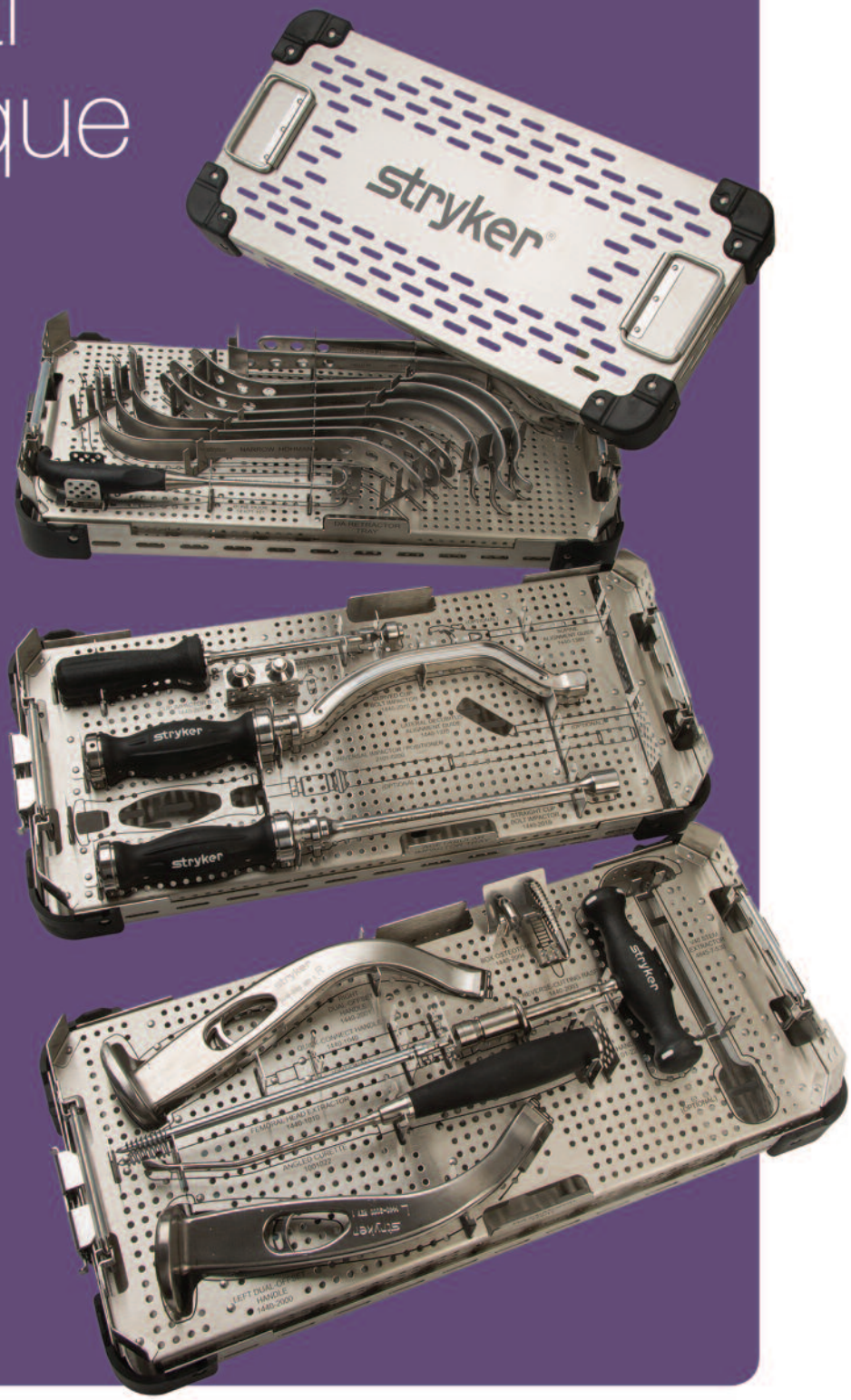
stryker

Orthopaedics

Direct Anterior

Direct Anterior Instrumentation

Surgical Technique



Direct Anterior Surgical Technique

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Acknowledgements

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William J. Hozack, M.D.
Adam Freedhand, M.D.
Jeffrey Garrison, M.D
Timothy Lovell, M.D.
Steven Myerthall, M.D.
Anthony Unger, M.D.

Intended Use / Contraindications

- The Intended User Profile is a licensed orthopaedic surgeon or trained OR support under the supervision of a licensed orthopaedic surgeon.
- The Intended Use of this instrumentation is for performing a Direct Anterior approach to total hip arthroplasty. All medical and surgical indications, contraindications and precautions customarily observed for total hip arthroplasty are applicable.
- The Intended Patient Population includes patients who meet the indications provided in the respective implant IFU (see **Product Compatibility**).
- Due to different manufacturers employing differing design parameters, varying tolerances, different materials and manufacturing specifications, Stryker Orthopaedics Instrumentation should not be used to implant any other manufacturer's components. Any such use will negate the responsibility of Stryker Orthopaedics for the performance of the resulting implant.
- Instruments made of non-metallic material(s) and fragments thereof may not be visible using certain forms of external imaging (e.g. x-ray) unless otherwise specified, such as radiopaque femoral head trials that are visible.

Warnings and Precautions

See package insert for warnings, precautions, adverse effects and other essential product information.

Product Compatibility

- Accolade II, Accolade TMZF and Anato stems* and compatible acetabular cups which include:
  - Trident
  - Tritanium
  - ADM
  - MDM

Cleaning & Sterilization

The devices are provided in a non-sterile condition and require cleaning and sterilization prior to use. They are designed for repeated use with an intended serviceable life of five years under normal peri-operative handling, cleaning, and sterilization conditions. Users should reference QIN4333, QIN4382, LSTPI-B and IFU 7023-99 for detailed instrument cleaning and processing instructions.

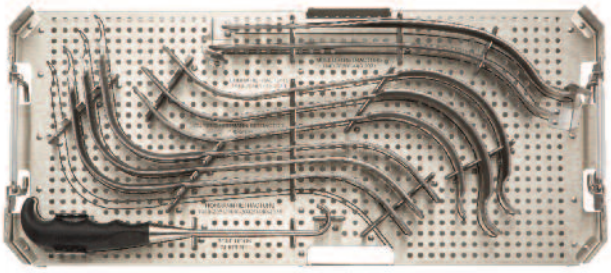
The decision to perform a Direct Anterior procedure is ultimately left to the surgeon's professional medical and clinical judgment. It is the surgeon who must carefully evaluate each patient to determine if Direct Anterior surgery is indeed appropriate. In some cases, performing an unfamiliar surgical technique may be associated with clinical risks. Stryker strongly recommends that surgeons complete a formalized training program before attempting these operative techniques on their own.

*Refer to CE Marking disclaimer on page 26 for current CE Marking Status of Anato Stems.

INSTRUMENTATION

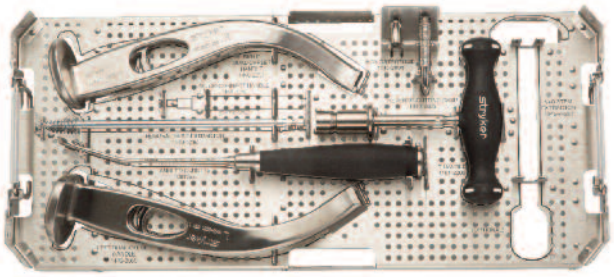
Retractor Tray

Description	P/N	Qty
Curved Hohmann	1440-2030	1
Standard Hohmann	1440-2031	2
Wide Hohmann	1440-2032	1
Deep Hohmann	1440-2033	Optional
Standard Cobra	1440-2040	1
Wide Cobra	1440-2041	1
Long Prong Mueller	1440-2020	1
Short Prong Mueller	1440-2021	1
Bone Hook	74-671-101	1
Retractor Internal Tray	1440-2091	1
Case	4845-7-600	1



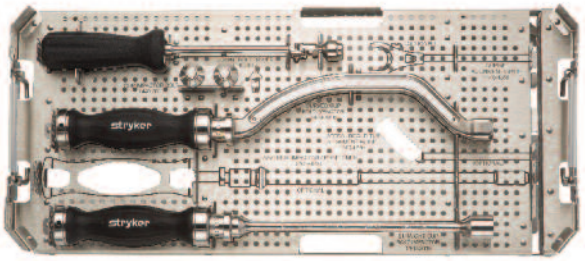
Femoral Tray

Description	P/N	Qty
Femoral Head Extractor	1440-1010	1
Reverse Cutting Rasp	1440-2003	1
V40 Stem Extractor	4845-7-530	tray space only
Modular Box Osteotome	1440-2004	1
Large T-Handle	1101-2200	1
Angled Curette	1001022	1
Left Dual Offset Handle	1440-2000	1
Right Dual Offset Handle	1440-2001	1
Quick-Connect Handle	1440-1040	Optional
Femoral Internal Tray	1440-2092	1
Case	4845-7-600	1



Acetabular Tray

Description	P/N	Qty
U-Joint Bolt Driver	1440-2017	1
Straight Cup Bolt Impactor	1440-2019	1
Curved Cup Bolt Impactor	1440-2010	1
Supine Alignment Guide	1440-1380	Optional
Lateral Decubitus Alignment Guide*	1440-1370	tray space only
Cup Impactor Bolt	1440-2011	2
Acetabular Internal Tray	1440-2093	1
Case	4845-7-600	1



Observe that components are not visibly damaged prior to use. Examine instrumentation against the tray layout to ensure all parts are accounted for (prior to and following surgery) and available for use.

*Not for use with the Direct Anterior approach.

INSTRUMENTATION / INTENDED USE

Retractors

- A variety of retractors including Hohmann, Mueller and Cobra style retractors are supplied in the set.
- These include retractors of different widths and profiles to accommodate various exposure objectives and should be used at the discretion of the operating surgeon.



1440-2030
Curved Hohmann retractor



1440-2031
Standard Hohmann retractor



1440-2032
Wide Hohmann retractor



1440-2033
Deep Hohmann retractor



1440-2040 / 1440-2041
Standard and Wide Cobra retractors



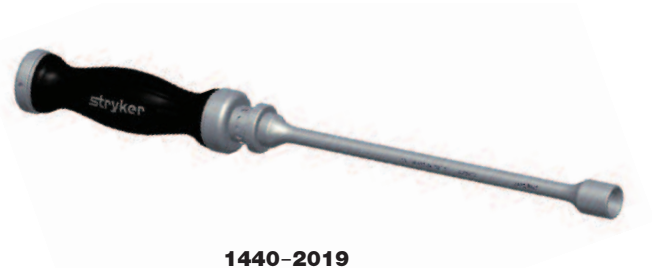
1440-2020
Long Prong Mueller retractor



1440-2021
Short Prong Mueller retractor

For Acetabular Preparation

- The Cup Impactor interfaces with Stryker Trident and Tritanium cups via a modular bolt. The bolt provides a method for repeated attachment and detachment of the cup impactor.
- The Supine Alignment guide offers a visual reference to estimate cup inclination and anteversion during impaction and is designed to aid the surgeon in placing the acetabular shell in approximately 45° of inclination and 20° of anteversion. (Proper positioning of the shell should be at the discretion of the operating surgeon).



1440-2019
Straight Cup Bolt Impactor



1440-1380
Supine Alignment Guide



1440-2010
Curved Cup Bolt Impactor



1440-2011
Cup Impactor Bolt



1440-2017
U-Joint Bolt Driver

For Femoral Preparation

- The Femoral Head Extractor and T-handle are designed for removal of the femoral head.
- The Bone hook aids in elevation of the femur during femoral preparation.
- The Angled Curette aids in sounding of the femoral canal prior to broaching and removal of lateral bone.
- The Modular Box Osteotome attaches to the Dual-Offset Handle and helps prepare the superolateral femoral neck.
- The Reverse-Cutting Rasp attaches to the Dual-Offset Handle and aids in lateralization and improving access to the femoral canal.



1101-2200
Large T-Handle



1440-1010
Femoral Head Extractor



1440-2004
Modular Box Osteotome



1440-2003
Reverse Cutting Rasp



1001022
Angled Curette



74-671-101
Bone Hook

Dual-Offset Handles

- The Right and Left Dual-Offset Handles provide soft tissue clearance during preparation of the femoral canal.
- The Quick-Connect Handle may be attached to the Dual-offset handle to provide version control of the broaches.



1440-2001
Right Handle



1440-2000
Left Handle



1440-1040
Quick-Connect Handle

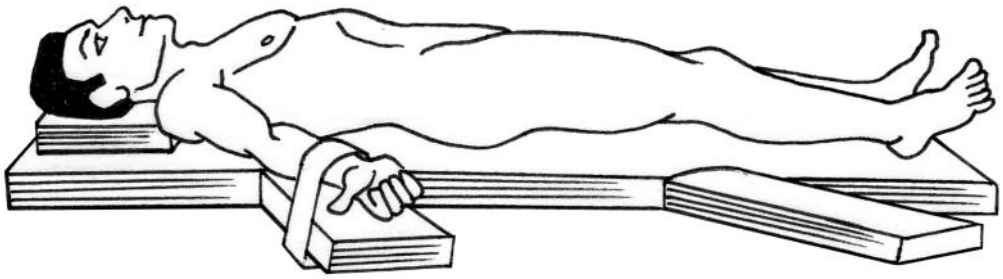
STEP 1

PREOPERATIVE PLANNING & PATIENT POSITIONING

Preoperative planning aids in the selection of the appropriate implant style and size for the patient's hip pathology. Preoperative X-ray analysis can be used to evaluate:

- Optimal femoral stem fit
- Prosthetic neck length
- Neck offset
- Acetabular component sizing
- Correct location of the osteotomy

Place the patient in a supine position on the operating table to create a predictable and stable pelvis position. One option is to place a hip bump under the pelvis as part of patient positioning to elevate the pelvis. This can facilitate femoral exposure if a special table is not used.



STEP 1

PATIENT POSITIONING

Figure 1 When preparing the femoral canal, the patient's leg will need to be repositioned with the operative leg placed in external rotation, adduction, and extension. Place the patient in the supine position. During femoral preparation, adduction of the operative leg will aid in access to the femoral canal. For this reason, a table attachment (such as an armboard) on the non-operative side may accommodate abduction of the non-operative leg.

Draping both legs is not absolutely necessary (as noted in Figure 1). Special fracture tables may also be used for leg manipulation, but are not presented within this technique.

Figures 2-3 Palpate the anterior superior iliac spine (ASIS) and the greater trochanter. 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.

NOTE

The location of the incision is significantly more lateral than the traditional Smith-Petersen interval. This is done to avoid the lateral femoral cutaneous nerve (LFCN) situated near the interval.



Figure 1

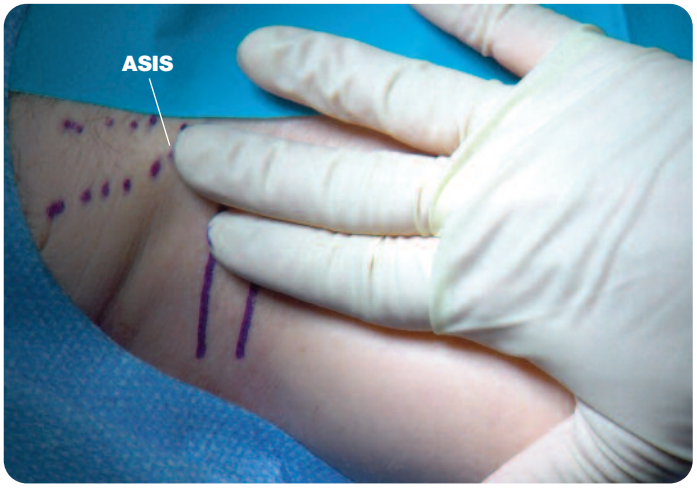


Figure 2

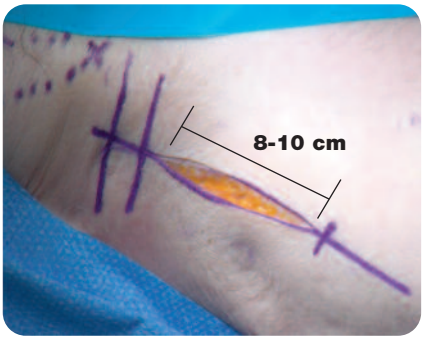


Figure 3

STEP 2

THE PORTAL

Figures 4-7 Once the skin is incised, confirm the location of the tensor fascia latae (TFL). Look for the white fascia of the gluteus medius and perforating vessels of the IT band at the lateral border of the tensor. The main branches of lateral femoral cutaneous nerve will be medial to the tensor.

Palpate the interval between the TFL and the sartorius muscle along its length. Access to this interval will be established strictly lateral under the fascia of the TFL to avoid damage to the LFCN.

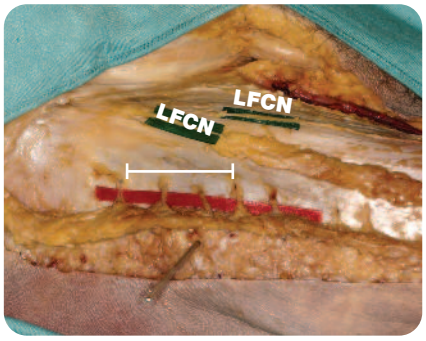


Figure 4 (exposed view)



Figure 5

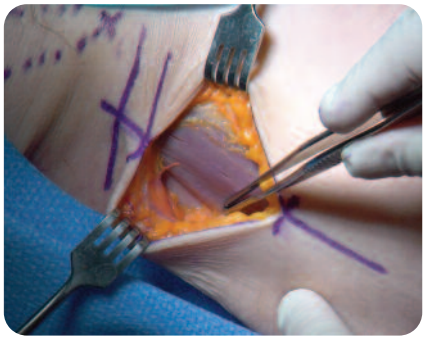


Figure 6

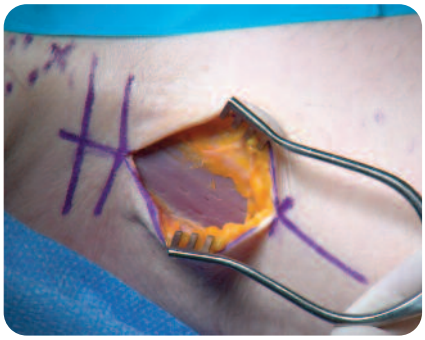


Figure 7

STEP 3

EXPOSURE OF THE JOINT – LATERAL RETRACTORS

Figure 8 Incise the fascia of the TFL slightly medial to its midpoint and extend the incision in-line with the muscular fibers.

Figure 9 Bluntly dissect the fascia from the tensor and perform the following steps strictly under the fascia. Gently pull the TFL muscle laterally to identify the Smith-Petersen interval. This interval is characterized by a fatty layer and the deep layer of the fascia latae that is covering it.

Figures 10-11 Palpate the supero-lateral region of the femoral neck and place the first blunt retractor (1) in this location.

Figure 12 Place a sharp retractor (2) infero-lateral to the greater trochanter. Use a rake or Hibbs retractor medially.

Excessive retraction force may result in bone, nerve or soft tissue damage. Proper retractor placement and adequate exposure are strongly recommended and described throughout the technique.

This technique describes the Hohmann retractors generally as "sharp" retractors and the Cobra retractors as "blunt" retractors.

NOTE

Retractor selection may be interchangeable at the discretion of the surgeon.

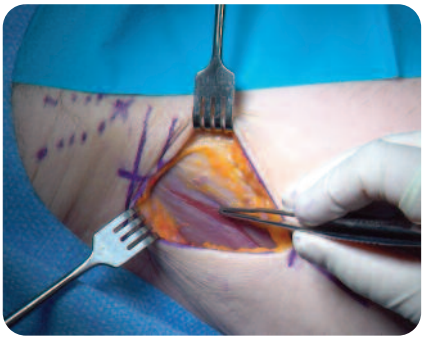


Figure 8

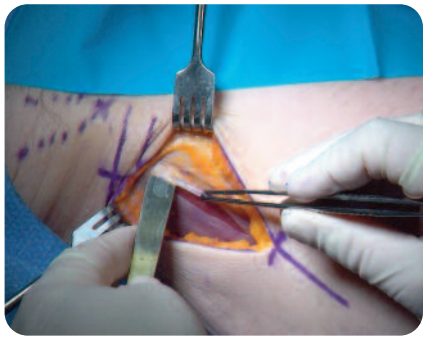


Figure 9

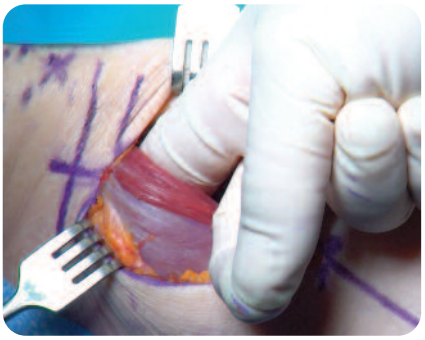


Figure 10

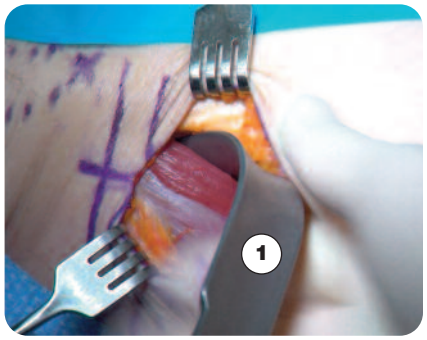


Figure 11

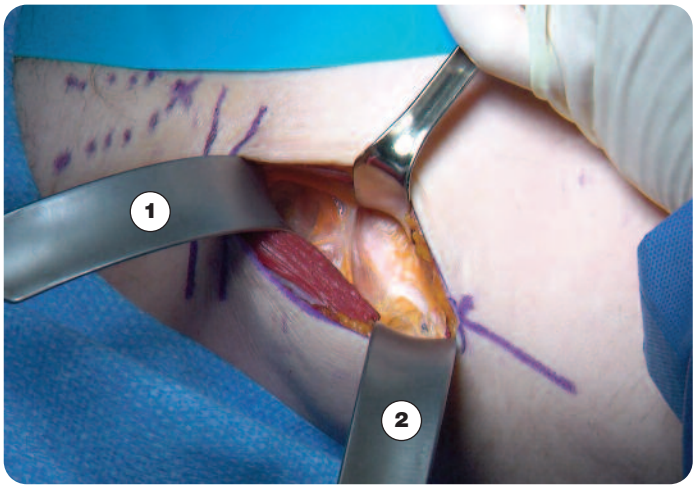


Figure 12

Instruments

Hohmann retractors
1440-2031, 1440-2032,
1440-2033

Cobra retractors
1440-2040
1440-2041

STEP 3

EXPOSURE OF THE JOINT – LATERAL RETRACTORS CONTINUED

Figures 13-14 Identify the ascending branches of the lateral circumflex vessels and cauterize or suture as necessary. The branches are variable in number and size and can be a source of significant bleeding.

Figure 15 The anatomic dissection shows the proximity of vascular structures and the ascending branches of the lateral circumflex vessels.

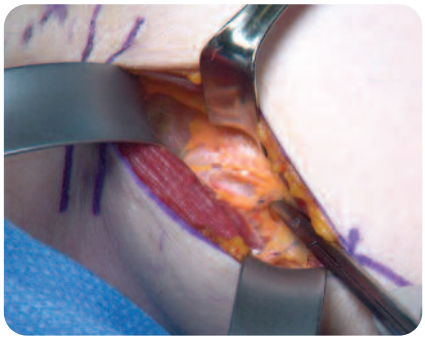


Figure 13

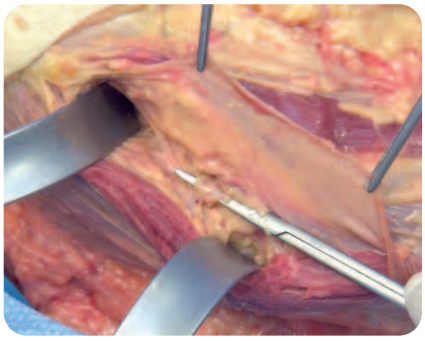


Figure 14 (exposed view)

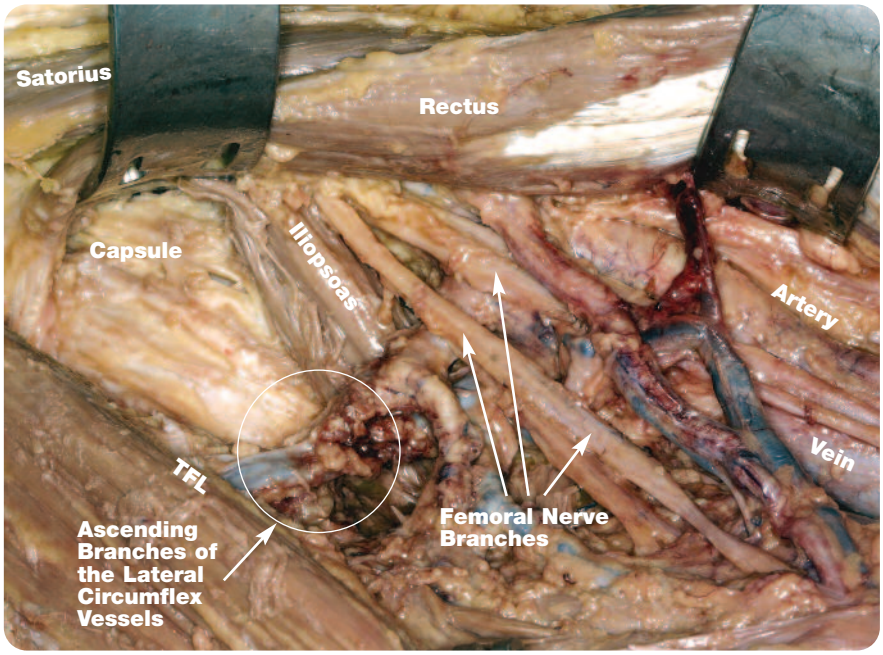


Figure 15 (exposed view)

STEP 4

EXPOSURE OF THE JOINT – MEDIAL RETRACTORS

Once the vessels are controlled, incise the fascia (i.e.; the deep layer of the iliotibial band) between the rectus femoris and the TFL, revealing the vastus lateralis. Cut this strong fascia between the rectus femoris and the capsule with an electrocautery device until the precapsular fat pad is visible.

Figure 16 Palpate the soft spot inferomedial to the neck and proximal to the vastus lateralis muscle.

Figures 17-18 Place a blunt retractor (3) in this location, retracting the rectus femoris and sartorius and more completely exposing the anterior capsule prior to performing the capsulotomy.

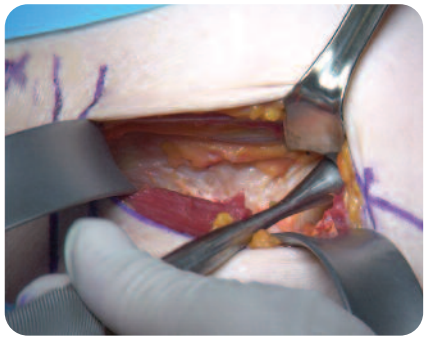


Figure 16

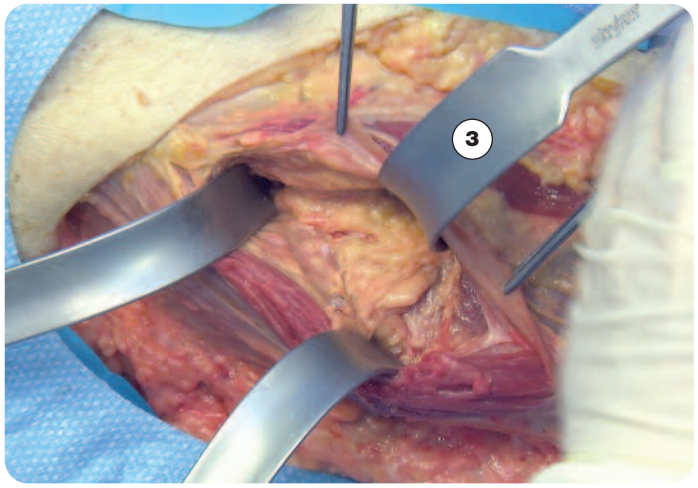


Figure 17 (exposed view)

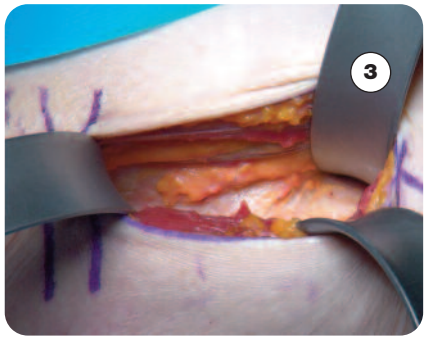


Figure 18

STEP 4

EXPOSURE OF THE JOINT – MEDIAL RETRACTORS CONTINUED

Figure 19 After releasing the fascia under the rectus, flex the hip. For additional exposure use a Cobb elevator to prepare space for a fourth retractor at the anterior rim of the acetabulum.

Keep the Cobb elevator aligned perpendicular to the ilio-inguinal ligament (parallel to the femoral neck) and on bone to avoid injury to the femoral nerve or the vascular bundle.

Figure 20 Exchange the Cobb elevator with a fourth sharp retractor (4) (Curved Hohmann recommended).

Figures 21-22 Keep the retractor perpendicular to the ilioinguinal band and under the ilipsoas muscle to avoid any damage to the neurovascular bundle.

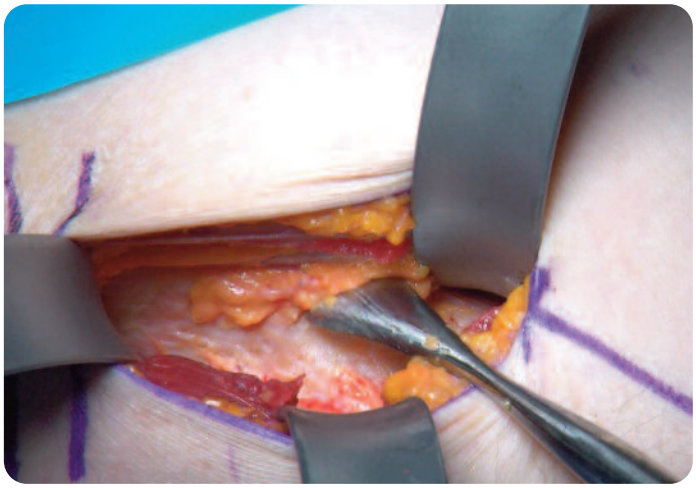


Figure 19

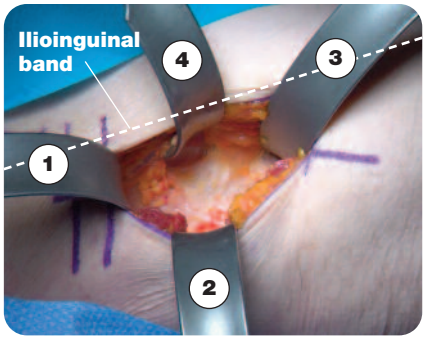


Figure 20

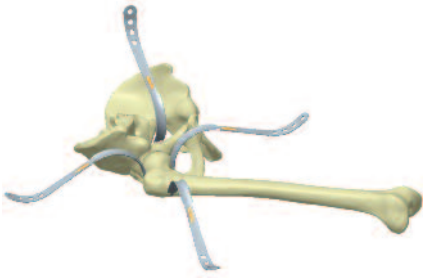


Figure 22

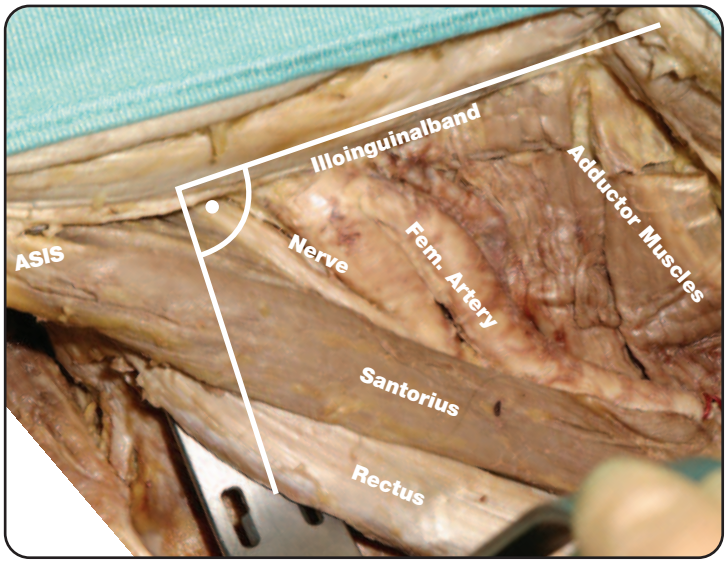


Figure 21 (exposed view)

Instruments

Curved Hohmann retractor
1440-2030



STEP 5

PREPARATION OF THE CAPSULE

If necessary, incise the reflected head of the rectus femoris at its capsular origin.

Depending on stiffness of the capsule, a variety of capsulotomies or capsulectomies can be performed. However, each method involves careful detachment of the capsule from the femoral neck.

Figures 23-24 Incise the capsule in line with the axis of the femoral neck, beginning near the acetabulum and extending to the intertrochanteric line. This incision may form the center of an H-shaped capsulotomy, with the sidelines of the H extending along the acetabular rim and the intertrochanteric line.

Alternatively, the anterior capsule may be removed. Create an incision parallel to the first, but further medial. Then detach the inferior portion of the capsule along the acetabulum and along the base of the interotrochenteric line. Incise the superior portion along the trochanteric line. Then cut along the acetabulum and extend distally.

Figures 25-26 Reposition the supero-lateral (1) and infero-medial retractors (3) inside the capsule. The blunt retractors are designed to protect the tip of the greater trochanter during the femoral neck osteotomy.

Carefully clear the "saddle" region between greater trochanter and the neck as this serves as 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 superolateral acetabulum and the saddle, and should be able to freely palpate the lesser trochanter.

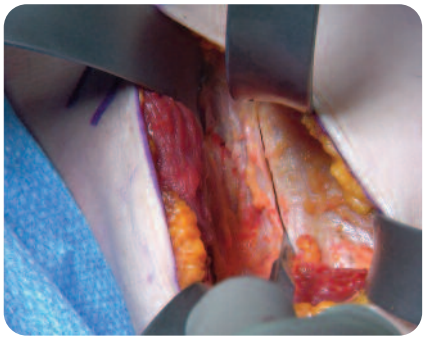


Figure 23

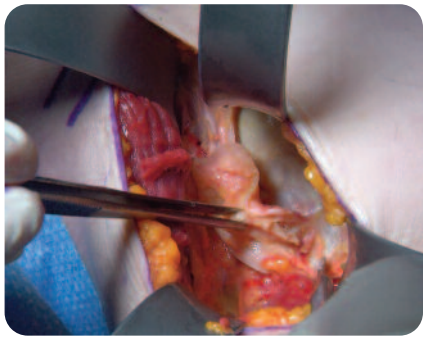


Figure 24

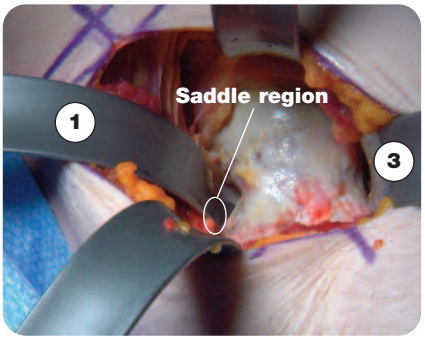


Figure 25

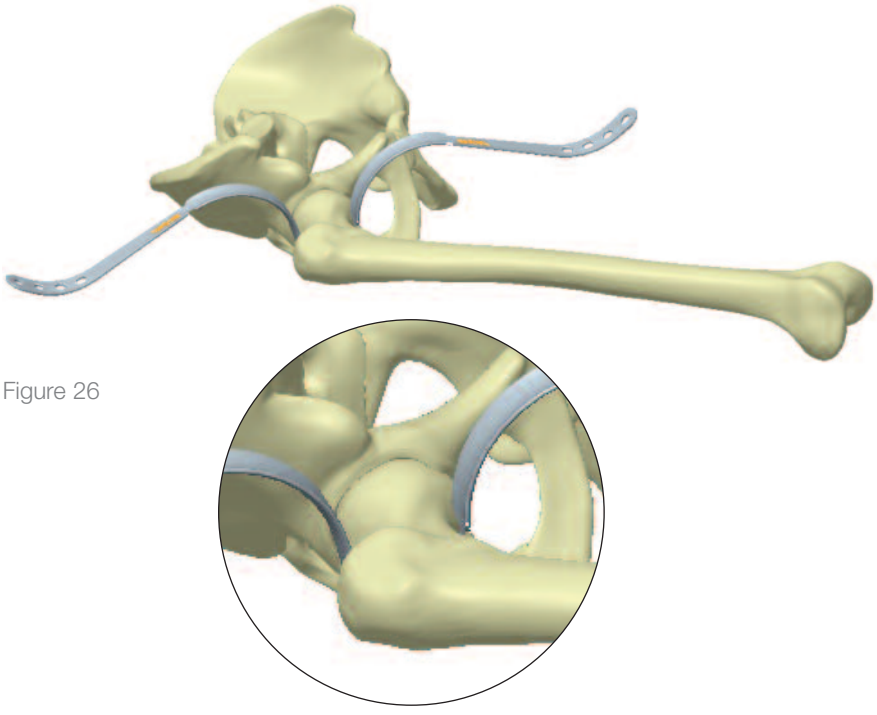


Figure 26

STEP 6

REMOVAL OF THE FEMORAL HEAD

Figures 27-28 Create a double osteotomy of the neck so that a wedge of the neck may be removed prior to the femoral head. Use a narrow or restricted-motion saw to avoid damage to the greater trochanter and other surrounding structures.

Ensure that both cuts are parallel or create a wedge that is wider at the anterior for ease of removal. Start the proximal cut as close to the femoral head as possible.

Begin the second cut from the saddle region of the neck and extend it to approximately 1cm above the lesser trochanter at approximately a 45 degree angle or according to your preoperative templating.

Figure 29 Use a Cobb elevator or osteotome to mobilize the neck wedge.

Remove the neck wedge with a towel clamp or tenaculum. Gentle traction on the leg will aid removal of the wedge and the femoral head.

Figures 30-31 Drill the Femoral Head Extractor into the femoral head and slowly pull the head out using a T-Handle.

NOTE

Remove any osteophytes at the anterior rim of the acetabulum that may impede removal of the head.

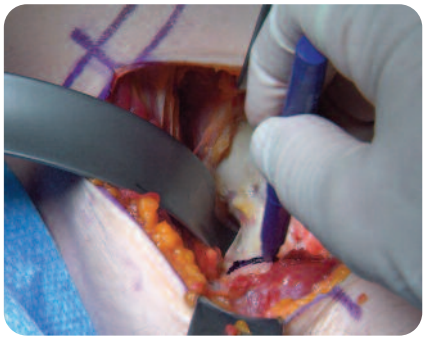


Figure 27

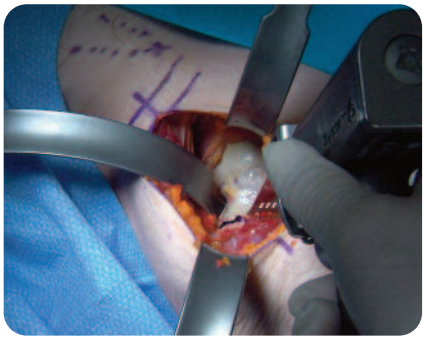


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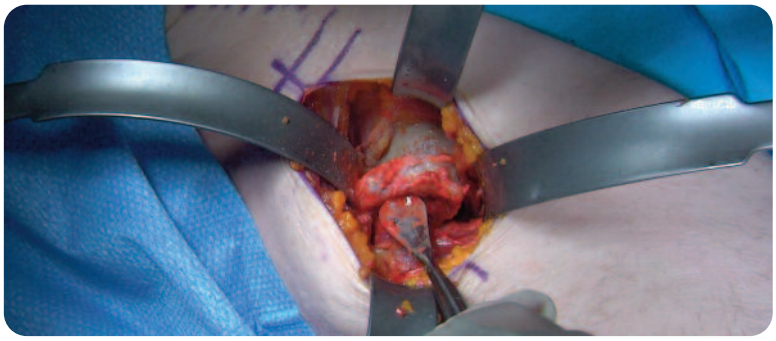


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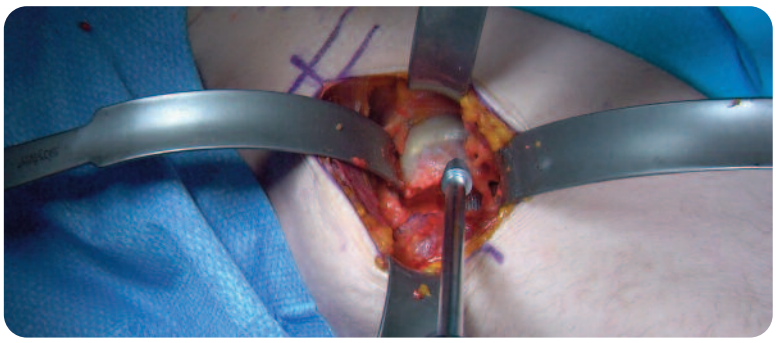


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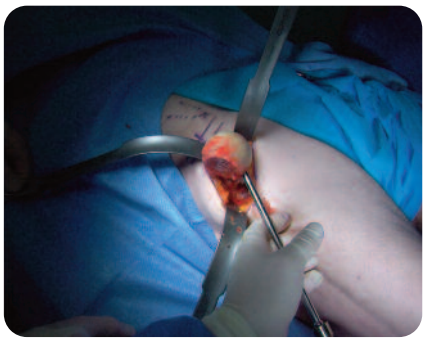


Figure 31

Instruments

Large T-Handle
1101-2200



Femoral Head Extractor
1440-1010



STEP 7

ACETABULAR EXPOSURE

Figure 32 Maintain the retractor at the anterior rim of the acetabulum (1). Remove all other retractors. Place a second retractor (2) infero-medial around the transverse acetabular ligament (TAL).

Place a third retractor (3) postero-lateral to the acetabulum. A fourth retractor can also be used to enhance exposure. Occasionally it is necessary make a small incision of the capsule to facilitate placement of the retractor.

Remove the remainder of the labrum.

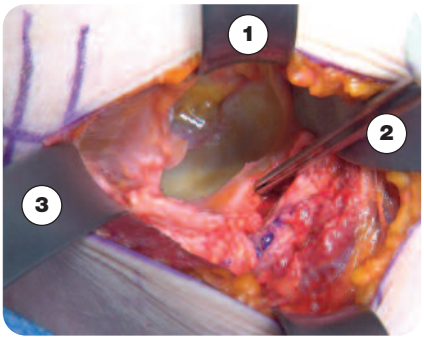
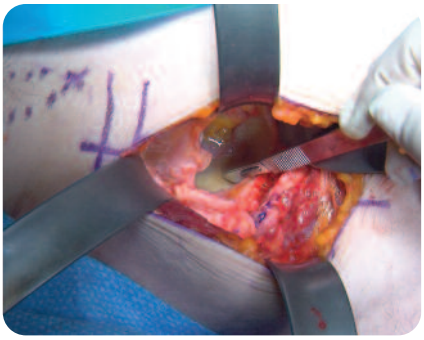


Figure 32

PREPARATION OF THE ACETABULUM

Figure 33 Incise the dorsal capsule (it usually forms a roll) in the region directly posterior to the acetabulum.

Figures 34-35 Place a fourth, Mueller retractor (4) at the posterior rim of the acetabulum. This retractor can be held in place by the first assistant or using weights.


Figure 33

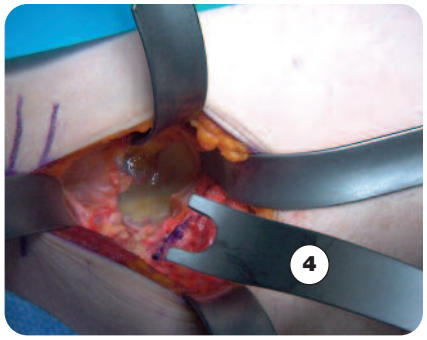


Figure 34

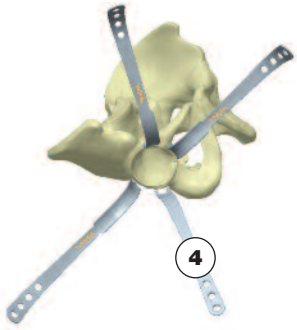


Figure 35

Instruments

Short Prong Mueller retractor
1440-2021



STEP 7

PREPARATION OF THE ACETABULUM CONTINUED

Figure 36 Select the first reamer as described in the surgical protocol for the planned acetabular implant. Use care introducing and removing the reamer. Use an Offset Reamer Handle to avoid impingement with lateral tissue and excessive force against the anterior acetabular wall.

Figure 37 As an alternative, introduce the reamer into the surgical site by hand and then attach the reamer handle. After reaming, use a clamp to retract the locking mechanism of the reamer handle and remove the reamer handle and reamer separately.

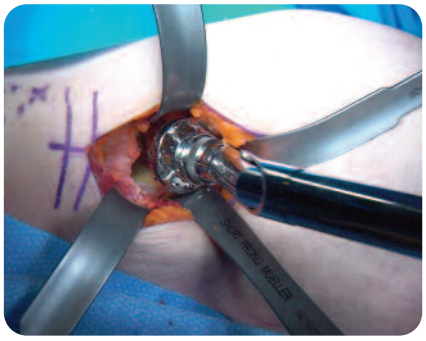


Figure 36



Figure 37

STEP 8

CUP INSERTION

Implant the cup using the Curved or Straight Cup Bolt Impactor with the Cup Impactor Bolt.

Figure 38 Fully thread the bolt onto the cup.

Insert the cup into the surgical site by hand.

Figures 39-40 Alternatively, insert the cup using the impactor, positioning the cup on the impactor so that any screw holes are oriented as desired.

Impact the cup in a manner consistent with its respective protocol. Avoid misdirected or excessive force.

NOTE

The impactor may be detached from the bolt. By keeping the bolt attached to the cup, the cup may be assessed for orientation and quickly reattached to the impactor if needed.

Figures 41-42 To remove the bolt, partially loosen it by rotating the impactor counterclockwise. Remove by hand, with the Straight Cup Impactor or with the U-Joint Bolt Driver if access to the bolt is limited.

Figure 43 If the cup needs to be repositioned after trial reduction, use the Straight Cup Impactor or the U-Joint Driver to re-insert the bolt. Screw forceps will help control the U-joint driver during reinsertion.



Figure 38

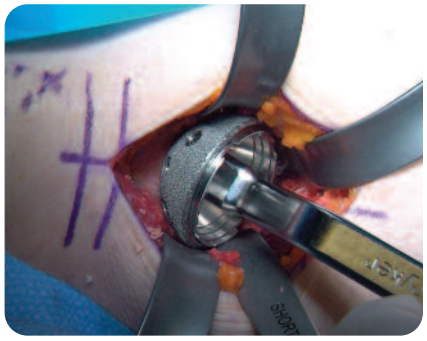


Figure 39

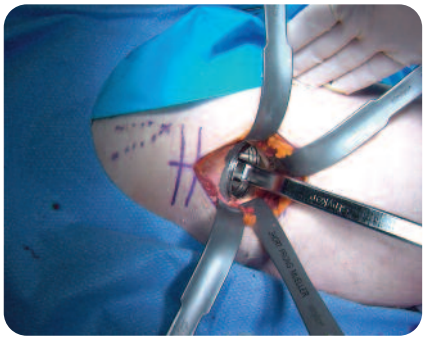


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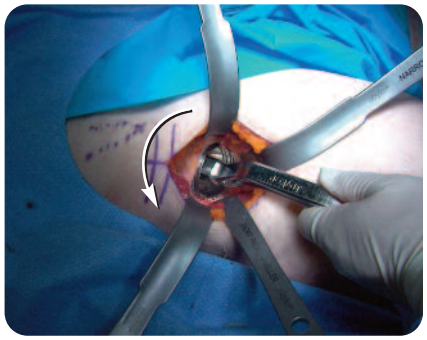


Figure 41

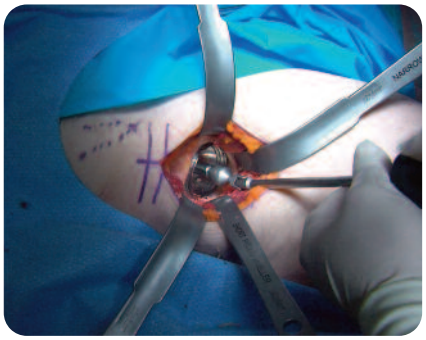


Figure 42

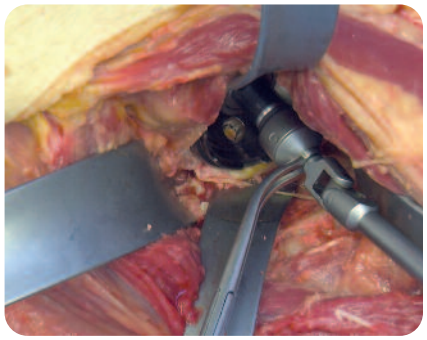


Figure 43 (exposed view)

Instruments

Curved Cup Bolt Impactor
1440-2010



Straight Cup Bolt Impactor
1440-2019



U-Joint Bolt Driver
1440-2017



Cup Impactor Bolt
1440-2011



STEP 8

CUP INSERTION CONTINUED

Supine Alignment Guide (Optional)

NOTE

The Supine Alignment Guide offers a visual reference to estimate cup inclination and anteversion.

Figures 44-45 Slide the Alignment Guide onto the Cup Impactor and rotate it around the spindle to the desired location. Align the plane of the two crossbars (line A) parallel to the frontal pelvic plane (line B). The frontal plane passes through the left and right ASIS and the pubic symphysis. This provides a visual approximation of 20° anteversion. Be sure to account for pelvic tilt when aligning crossbars to the floor or OR operating table.

Figure 46 Align the side-specific crossbar (line C) with the mid-sagittal plane of the pelvis (line D). The mid-sagittal plane can be approximated as the long-axis of the body. This alignment provides a visual approximation of 45° cup inclination.



Figure 44

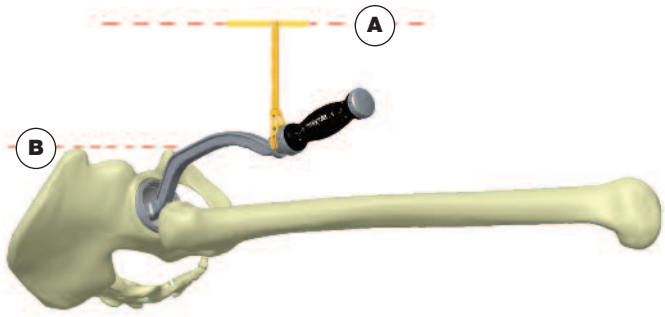


Figure 45

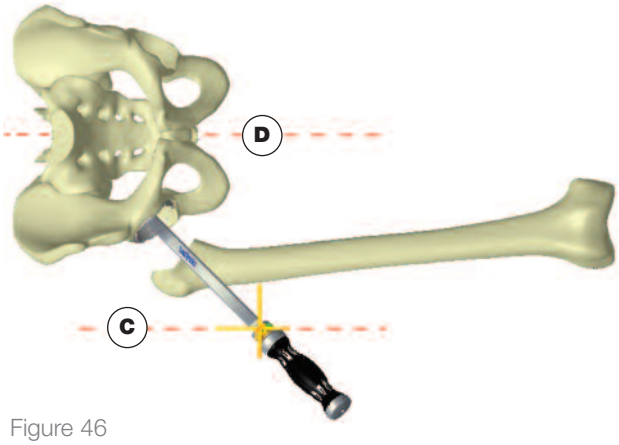


Figure 46

Instruments

Supine Alignment Guide
1440-1380



STEP 9

SCREW PLACEMENT (OPTIONAL)

Figures 47-48 If screw fixation is desired, use a flexible drill and drill guide.

Figure 49 Use a u-joint screwdriver or flexible screwdriver to place the screws.



Figure 47



Figure 48

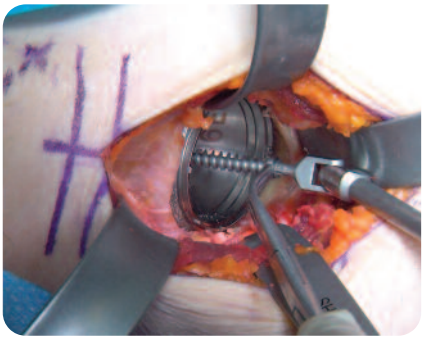


Figure 49

STEP 10

LINER INSERTION

Figures 50-51 Insert the appropriate liner and seat it using a liner impactor. Figure 51 pictures the Insert Positioner/ Impactor Handle (2111-0000B), however the surgeon should follow the recommended instrumentation in the surgical technique that matches the liner being implanted.

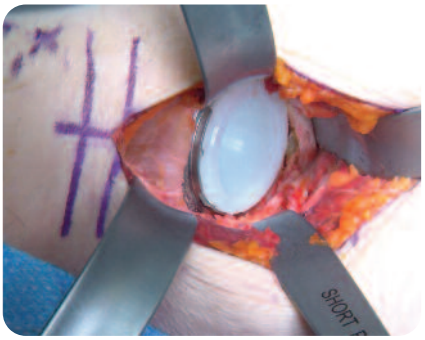


Figure 50



Figure 51

STEP 11

PREPARATION OF THE POSTERO-LATERAL CAPSULE

Figure 52 Remove the postero-lateral acetabular retractors. Position the leg in adduction and external rotation. Place a sharp retractor infero-lateral to the greater trochanter. Place a double-pronged retractor posterior to the greater trochanter, between the external rotators and the capsule.

Grasp the posterolateral capsular flap and use electrocautery to dissect the capsular and fatty tissue until the short external rotators are visible (e.g. piriformis, obturator, gemelli).

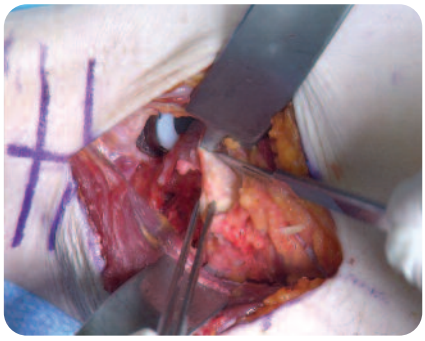


Figure 52

STEP 12

FIGURE 4 POSITION TO MARK FEMORAL ORIENTATION

NOTE

Optional for standard OR table users only.

Figures 53-54 Remove all retractors. Externally rotate the leg and flex the knee into a "Figure 4" position. Place one Mueller retractor medial and one sharp retractor lateral to the femur, exposing the resected calcar region.

Remove any capsular tissue covering the calcar region.

Figures 55-56 Mark the neutral rotation of the femur with electrocautery. Knee flexion is only used for calcar exposure and determination of the neck version.

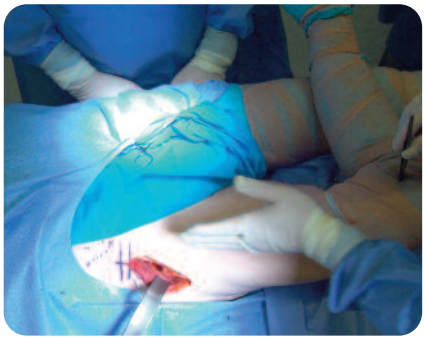


Figure 53

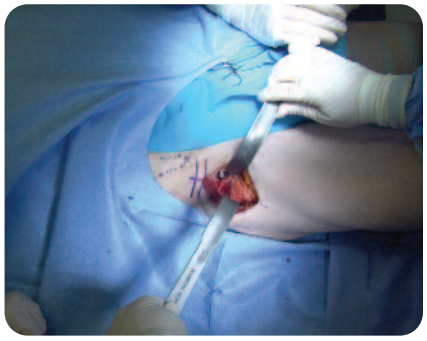


Figure 54

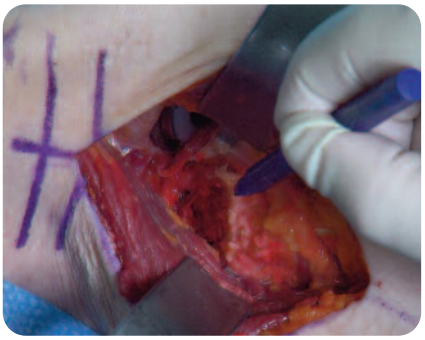


Figure 55

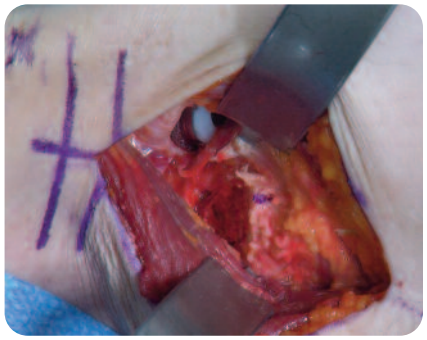


Figure 56

STEP 13

EXPOSURE OF THE FEMUR

Figures 57-58 For femoral exposure abduct the non-operative leg. After extending the leg 30°- 40° with no knee flexion the foot is externally rotated and is adducted to expose the cut surface of the femoral neck.

NOTE

For standard OR table users leg extension is facilitated by breaking the midpoint of the OR table.



Figure 57

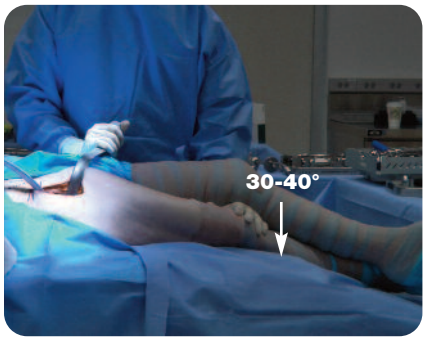


Figure 58

If both legs are draped, the operative leg can be crossed under the non-operative leg and an assistant's hand in order to support external rotation. Keep the knee of the operative leg extended in order to reduce muscular force at the proximal femur and to increase exposure.

STEP 13

EXPOSURE OF THE FEMUR CONTINUED

With the patient's perineum positioned at the hinge of the bed, hip extension, rather than back extension, is achieved by lowering the foot of the bed. Putting the patient in Trendelenberg allows more hip extension without risking contaminating the foot of the bed. Prior to leveling the bed, it is important to first raise the foot of the bed to avoid contamination that may result from removing the Trendelenberg first. If a fracture table or leg holder device is used, follow the manufacturer's instructions to achieve proper patient position.

NOTE

For surgeons that use a special table, external rotation, extension and adduction is achieved through manipulation of the table attachment.

Both techniques require this specific leg position to provide for a safe exposure of the proximal femur.

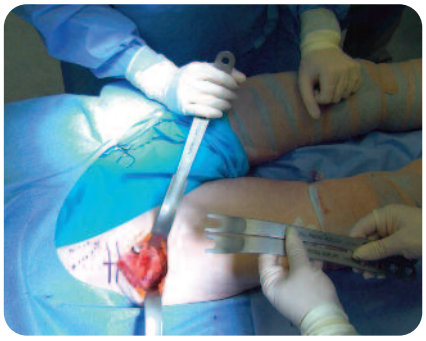


Figure 59

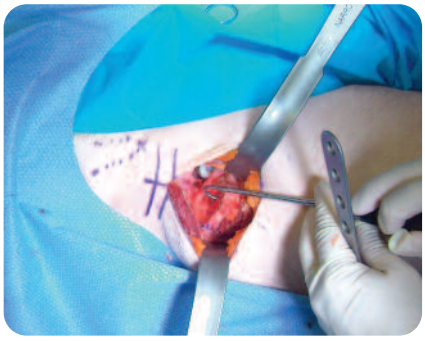


Figure 60

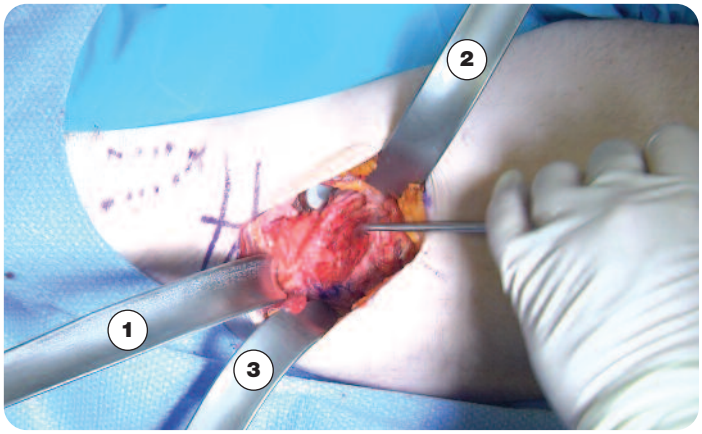


Figure 61

Figures 59-61 Place a Long-Prong Mueller retractor (1) behind the superior aspect of the greater trochanter, in front of the gluteus medius. Place the Bone Hook inside the calcar region of the resected neck and slowly elevate the femur anterolateral. Adjust the Long Prong Mueller as needed to maintain the femoral elevation. Always combine pulling of the bone hook and levering of the retractor to minimize forces to the greater trochanter. Releases of posterior structures may be required to achieve proper femoral exposure.

NOTE

In some cases, the tip of the greater trochanter is behind the acetabulum. Pull the Bone Hook first laterally in order to free the greater trochanter and then pull anteriorly.

Place a retractor (2) medial in the calcar region, proximal to the iliopsoas tendon

If desired, place a second retractor (3) laterally at the proximal femur.

Instruments

Long Prong Mueller retractor
1440-2020



Bone Hook
74-671-101



STEP 13

POSSIBLE RELEASES

Figure 62 The insertion of the gluteus minimus, piriformis, gemellus superior, obturator internus and gemellus inferior are found at the tip of the greater trochanter and in the trochanteric fossa.

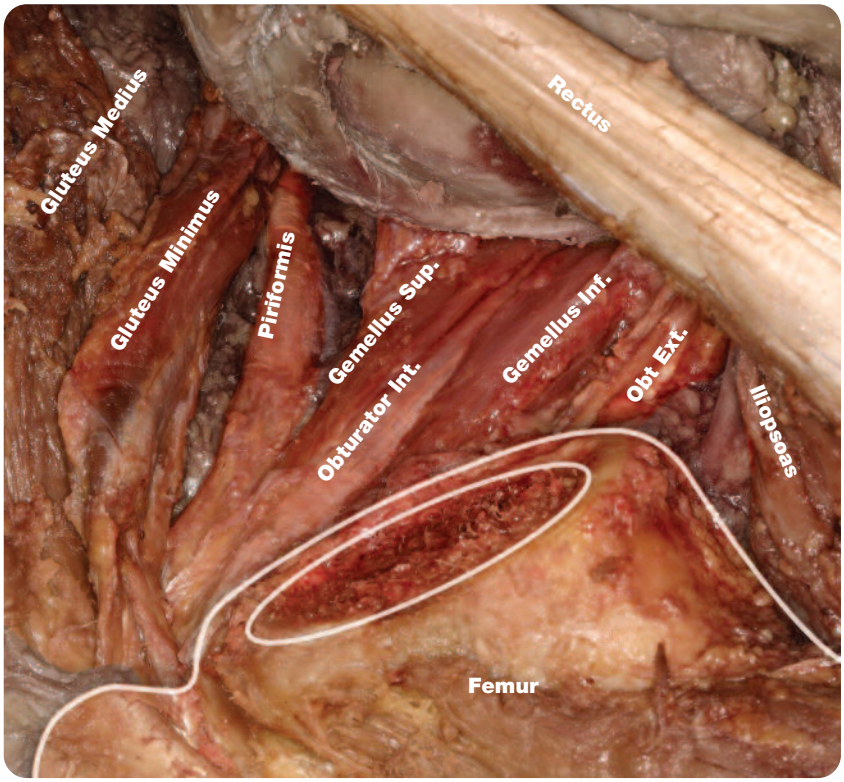


Figure 62 (exposed view)

STEP 14

OPENING THE FEMORAL CANAL

Figures 63-64 Use the Angled Curette to carefully open and sound the direction of the femoral canal.

Use a Rongeur or the Modular Box Osteotome to remove bone in the superolateral region of the neck. This step helps minimize undersizing and varus positioning of the femoral broach and stem.

Figures 65-66 The Reverse Cutting Rasp may also be used to lateralize and open the femoral canal. The Rasp operates in one direction and cuts as it is pulled out of the femur.

Ensure the Modular Box Osteotome and Reverse-Cutting Rasp are firmly attached to the handle before use. Avoid excessive or misdirected impaction or rasping motions.

NOTE

The Quick-Connect Handle may be attached to the Dual-offset handle to provide version control of the broaches.

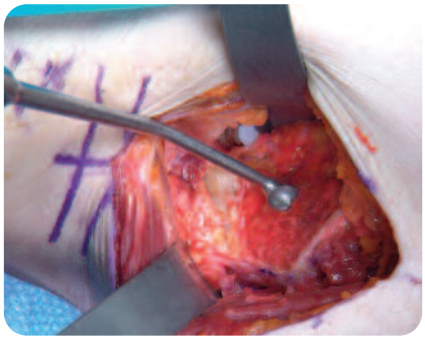


Figure 63

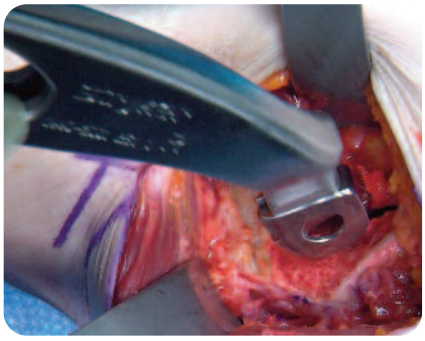


Figure 64

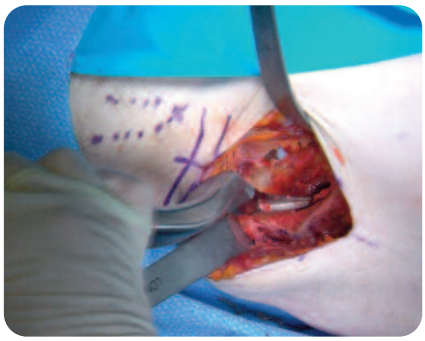


Figure 65



Figure 66

Instruments

Angled Curette
1001022

Right Handle
1440-2001

Modular Box Osteotome
1440-2004

Reverse Cutting Rasp
1440-2003

Quick-Connect Handle
1440-1040

STEP 15

BROACHING THE FEMUR

The Dual-Offset Handle facilitates the introduction and alignment of the broaches.

Figures 67-68 Using the Dual-Offset Handle, push the smallest broach 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.

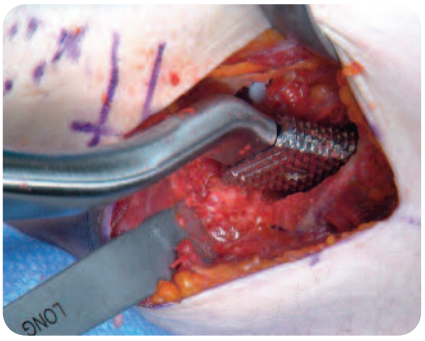


Figure 67

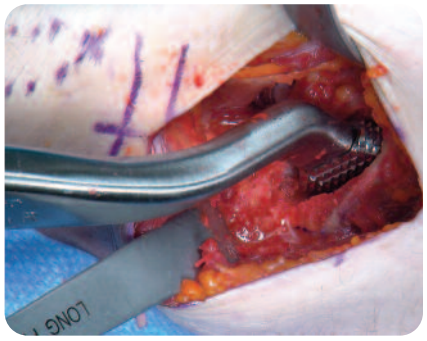


Figure 68

NOTE

Continue progressive broaching in a manner consistent with the respective implant protocol. Avoid excessive or misdirected impaction or broaching motions.

Figure 69 Keep the final broach in place to complete a trial reduction. Trialing with different heads and neck trials is performed until leg length, range of motion and hip stability are satisfactory.

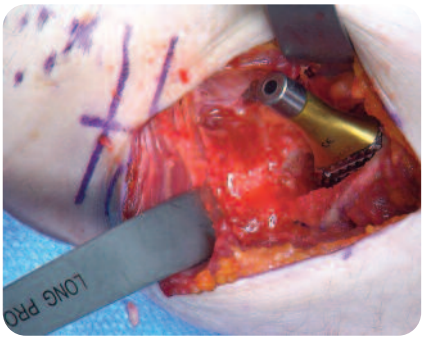


Figure 69

STEP 16

IMPLANTATION AND CLOSURE

Figures 70-71 Introduce the implant by hand into the broached cavity. Using a bullet-tip stem impactor, advance the stem in a manner consistent with its respective protocol. The bullet-tip impactors are designed to swivel on the drive hole of the stem.

Figure 72 Verify the head is secure on the trunnion after head impaction by applying traction to the head and confirming stability on the trunnion. If necessary, the head can be removed utilizing the head disassembly instrument.* Relocate the femoral head into the acetabular cup and re-check the hip biomechanics. The surgical site is then closed according to surgeon preference.

*If a ceramic head is placed on the trunnion and then removed, it must be replaced with a V40 cobalt chrome head or a V40 Titanium Adapter Sleeve (17-0000E) and a C-Taper ceramic head.

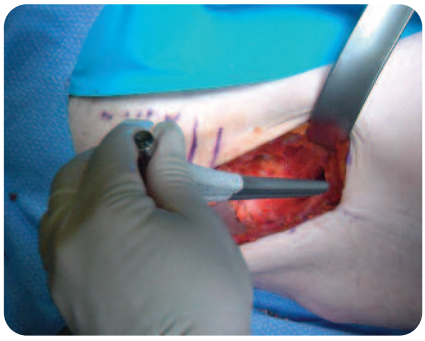


Figure 70

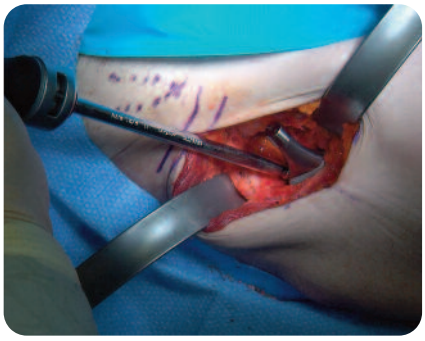


Figure 71

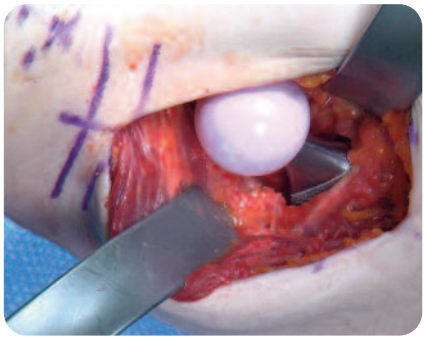


Figure 72

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Literature Number: **LIS-SP-1**

KAM 254 9/13

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