

# H1<sup>®</sup> Hip Resurfacing

Surgical Technique





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## Introduction

### RESURFACING

A collaboration between Embody Orthopaedic, Imperial College London, CeramTec and Medicoat, the H1 Implant is a cementless, ceramic-on-ceramic hip resurfacing arthroplasty. The H1 Implant can be used for both men and women and encompasses a head size range from 40 to 58 mm.

### CERAMIC

The BIOLOX®delta bearing surfaces are well established in total hip replacement.



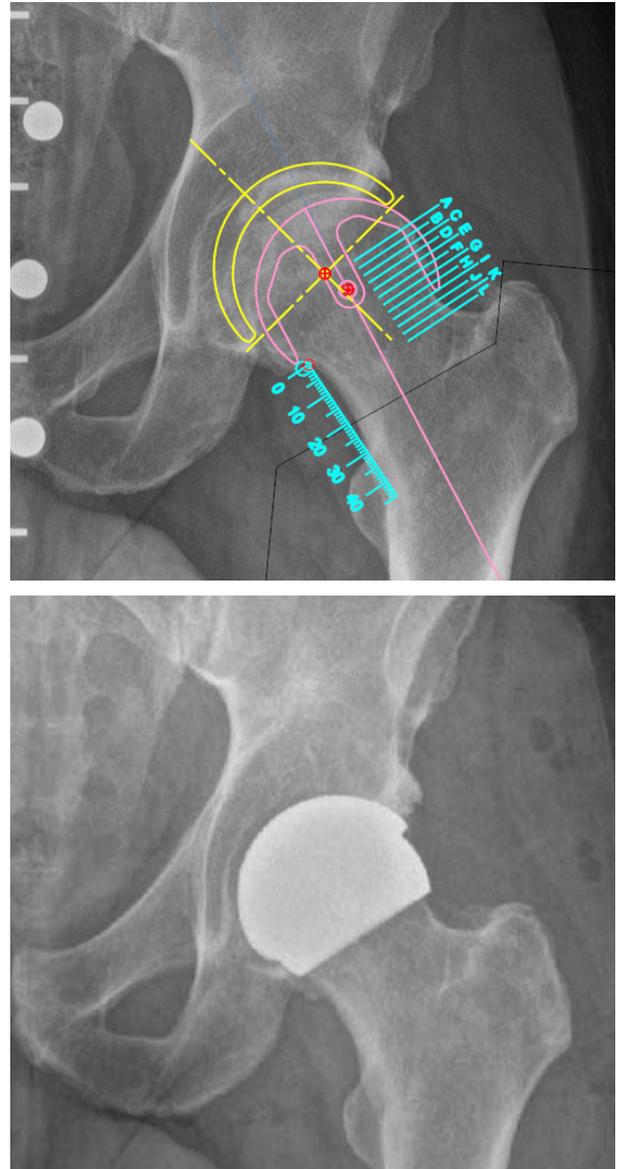
### CEMENTLESS

Cementless fixation is achieved on both the H1 Head and H1 Cup using vacuum plasma sprayed titanium and hydroxyapatite.



### PLANNING

Pre-operative planning links directly to the Head Guide for correct implant positioning.



### TRAINING

The H1 Implant is designed for use by trained hip arthroplasty surgeons. Prior to use, the surgeon should receive training in the indications for the H1 Implant, and in the H1 Instruments and the H1 Surgical Technique. Surgeon and surgical team familiarity with the H1 Surgical Technique, the H1 Implant IFU and the H1 Instruments IFU is essential for optimal results. The H1 Implant IFU is available on <http://ifu.embody-ortho.com>. The IFU for the H1 Instruments (Ref 5401000301) is available on <http://labeling.zimmerbiomet.com>.

## Description of Device

The H1 Implant consists of a stemmed femoral head resurfacing component, and a hemispherical acetabular cup both made from zirconia toughened alumina (ZTA). Both implants are designed for cementless, press-fit fixation and have vacuum plasma sprayed titanium and hydroxyapatite (HA) coating. The H1 Cup has a contoured rim. The H1 Implant is a single-use sterile medical device. This device is intended only for use by a trained professional orthopaedic surgeon. The H1 Implant is supplied in 10 sizes, each H1 Head is compatible with a single H1 Cup.

### INTENDED PURPOSE

The intended purpose of the H1 Implant is to provide an artificial substitute for a disease-damaged hip joint to replace the articulating surfaces of the hip while preserving the underlying femoral head and natural femoral neck. This is standard for a resurfacing hip prosthesis. The H1 Hip Resurfacing Instruments are designed for the H1 Implant of Legal Manufacturer Embody Orthopaedic Limited and are intended to be used by orthopaedic surgeons to facilitate the implantation of the H1 Implant.

### INTENDED USER

The user is defined as a person who interacts with (operates or handles) the complete device and could be any of the following people:

- Lead orthopaedic surgeon
- Assistant orthopaedic surgeon(s)
- Theatre nurse(s)

The patient is not considered to be a user of the device.

### INDICATIONS FOR USE

The H1 Implant is intended for use in skeletally mature patients requiring primary hip resurfacing arthroplasty due to:

- Primary osteoarthritis
- Osteoarthritis secondary to e.g. trauma, avascular necrosis, developmental hip dysplasia or other self-limiting conditions

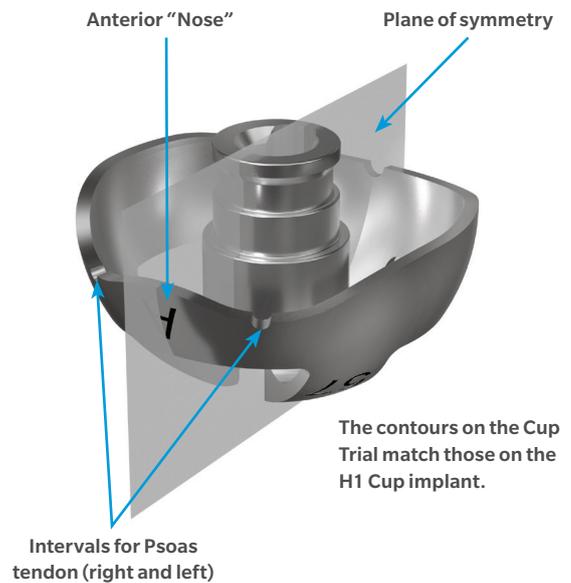
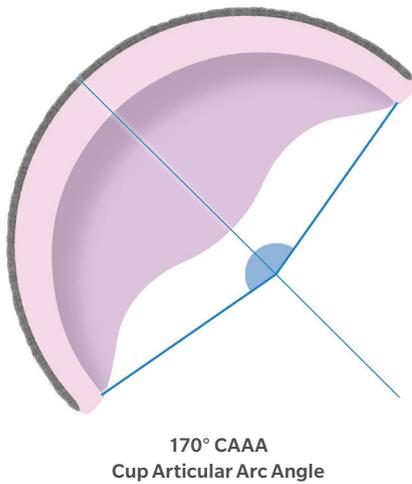
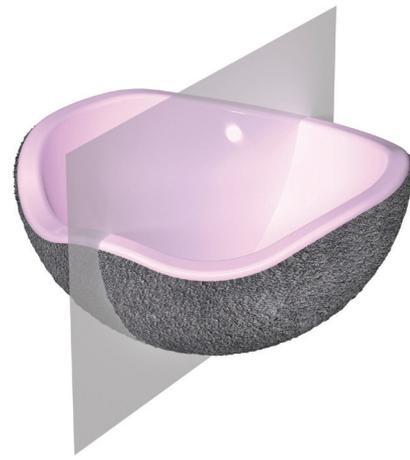
### CONTRAINDICATIONS

The H1 Implant is not intended for patients:

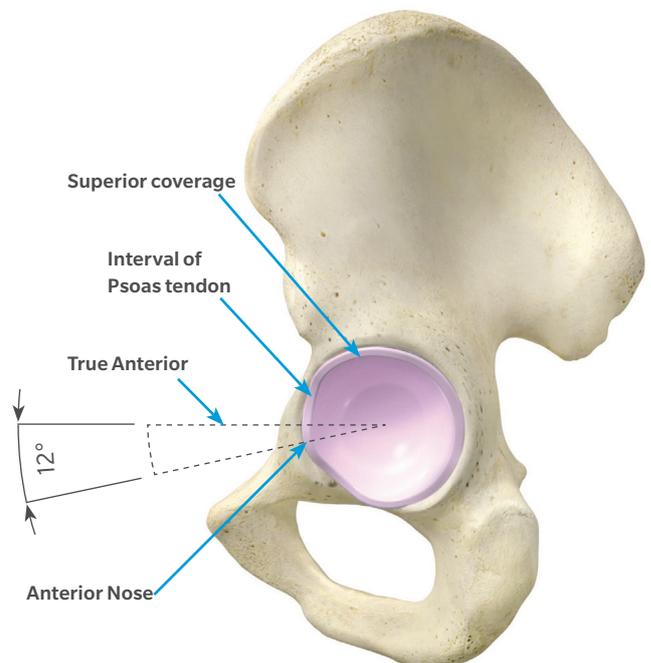
- With BMI greater than 40 kg/m<sup>2</sup>
- With active infection or sepsis (treated or untreated)
- With insufficient bone stock at the hip (>1/3 necrosis of the femoral head or large and multiple cysts) or in general as in severe osteopenia or osteoporosis (Tscore < -2.5 as measured with BMD)
- Who are pregnant
- Who are breastfeeding

## THE H1 CUP

The contours of the H1 Cup are derived from the natural profile of the acetabulum and make it easier to place the cup at the preferred inclination and anteversion angles of 45° and 20° while avoiding implant overhang and without compromising coverage.



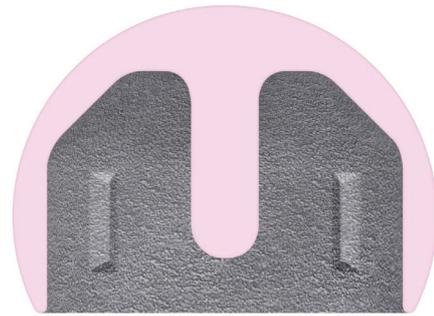
In addition to positioning the H1 Cup at the preferred inclination and anteversion angles, rotational orientation must also be considered due to the contours. The rotational position of the cup should ensure that the region of maximum bearing coverage is positioned superiorly whilst the ilio-pubic interval is aligned with the natural recess without overhang. In this position, the "anterior nose" should be approximately 12° inferior to the true anterior position.



## The H1 Head

The H1 Head is a short-stemmed resurfacing femoral component with 4 fins on the cylinder section to aid in rotational stability.

The stem length varies with H1 Head size and there are 3 diameters of stem over the 10 size range:



Head Sizes	Stem Diameter	Stem Drill	Head Loader
40 42 44	7.5 mm	45110H1	47510H1
46 48 50	8.0 mm	45120H1	47520H1
52 54 56 58	8.5 mm	45130H1	47530H1

## Size Chart

Each H1 Head has a single H1 Cup pairing and must only be used with that size:

Cup Size	47	49	51	53	55	57	59	61	63	65
Head Size	40	42	44	46	48	50	52	54	56	58

The H1 Head bearing size is as-labelled. The matching H1 Cup has an external spherical diameter 7 mm bigger and this is its labelled size, but it is truly 0.5 mm bigger than this due to the rough coating.

For example, the size 50 H1 Head is paired with the size 57 H1 Cup (actual size 57.5 mm).

## The H1 Instruments

The H1 Instruments are standard reusable hip resurfacing instruments made from stainless steel, a hard polymer (PPSU) and silicone.

There are 10 sizes of Cup Trial, Head Trial, Cutters and Impaction Caps to match the 10 sizes of H1 Implant.

Colour-coding is used to indicate size wherever necessary.

The Head Guide Jaws are the only instruments with right and left hip options.

There are detailed explanations of some of the instruments in the **APPENDICES**; these should be consulted before use.

There are markings on some of the instruments to provide guidance to the user:

**POST:** Posterior view of the femur

**ANT:** Anterior view of the femur

**R:** Right hip

**L:** Left hip

**INF:** Inferior/medial side of the femur

**SUP:** Superior/lateral side of the femur

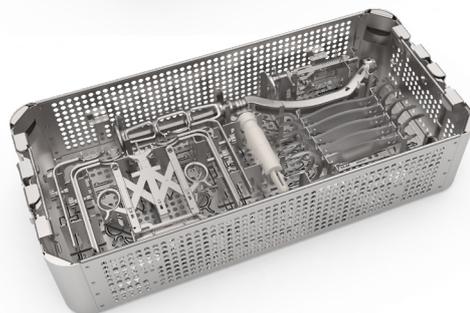
**LATERAL:** Lateral patient position

**SUPINE:** Supine patient position

**TOP:** Part that should face upwards

○: Posterior-Right or Anterior-Left (Head Guide Jaws)

△: Posterior-Left or Anterior-Right (Head Guide Jaws)



## Pre-Operative Planning

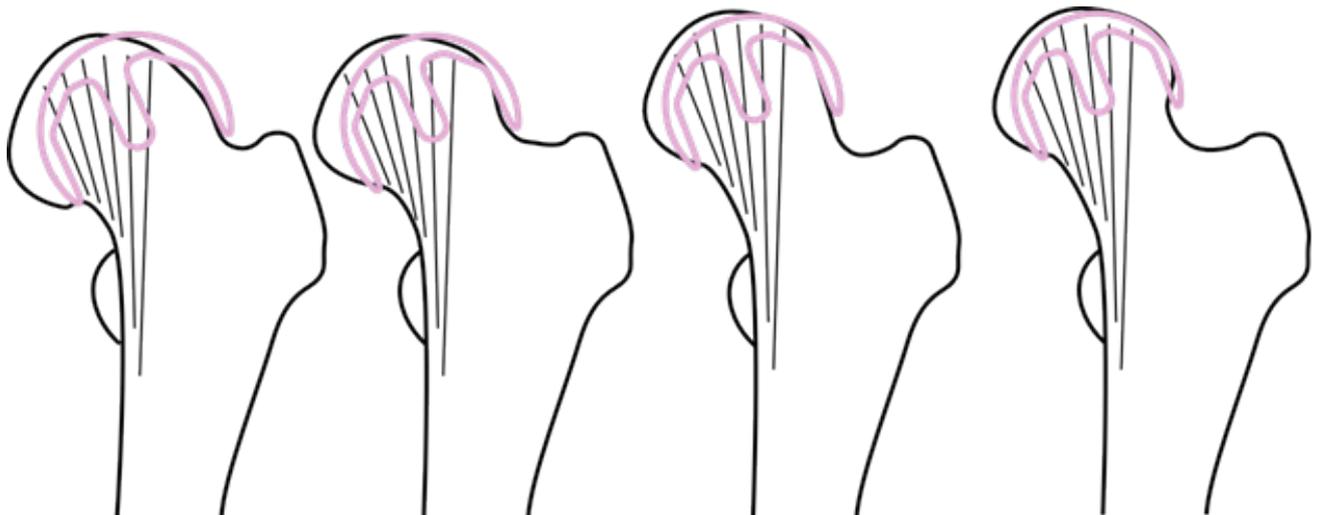
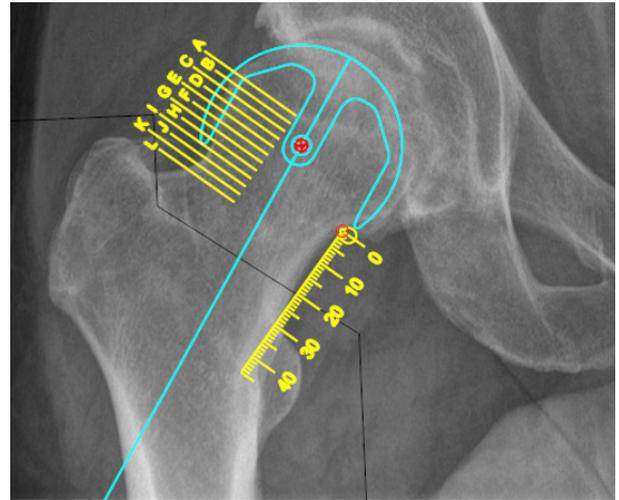
Pre-operative planning and templating help to determine the size and preferred position of both the H1 Head and H1 Cup and are important parts of the H1 Surgical Technique.

Planning is best performed using digital templating software with a calibrated AP pelvic radiograph with the limb internally rotated by approximately 15°.

It is essential to ensure that the H1 Head is orientated into adequate valgus, which is illustrated in the image below for a variety of femoral morphologies.

Refer to **APPENDIX A** for information about H1 Head placement.

Refer to **APPENDIX B** for full details regarding the pre-operative planning process for the H1.



## Surgical Considerations

### Approach

Surgeons should use the approach to the hip that they consider is in their patient's best interest. As with total hip arthroplasty, the entire circumference of the acetabulum must be adequately visualised. The presence of the femoral head and neck provides an additional challenge, as this large structure needs to be retracted and positioned out of the way of the instruments needed for acetabular preparation.

### Technique Order

Surgeons may choose to perform the H1 Hip Resurfacing using either a 'femur first' or a 'acetabulum first' technique. The 'femur first' technique, described here, is routine in cam and dysplastic cases and reduces the size of the head before acetabular preparation, improving visualisation of the socket. The 'acetabulum first' technique may require more soft tissue dissection for adequate access but may be preferred in profunda cases where minimising the size of the acetabular component is critical. Refer to Appendix C for further detail regarding the different sequence of surgical steps between the acetabulum first and femur first technique.

### Femoral Exposure

The femoral head should be exposed to allow circumferential inspection of the femoral head and neck. Osteophytes at the head/neck junction should be identified and compared with the pre-operative images. These osteophytes need to be removed

to allow a visual confirmation of the head/neck junction both medially and laterally, but care should be taken to not remove non-osteophytic bone.

### Acetabular exposure

*Using the posterior approach [4], the surgeon should consider:*

**Muscle release:** tendon of gluteus maximus, quadratus femoris, obturator externus, inferior gemellus, obturator internus, superior gemellus and piriformis. Gluteus minimus is lifted off the ilium to create a pocket for the femoral head.

**Capsulotomy:** The superior end of the posterior capsulotomy is continued around the superior rim onto the anterior wall, then completed with capsulotomy scissors from the lesser trochanter upwards, allowing the femoral head to sublux anterosuperiorly.

*Using the anterior approach [5,6] the surgeon should consider:*

**Muscle release:** anterior 20mm of tensor fascia lata origin from the iliac crest.

**Capsulotomy:** The lateral end of the peri-acetabular anterior capsulotomy is extended posteriorly past the mid-coronal plane before dislocation, while the medial release of the pubofemoral ligament continues round to the lesser trochanter. Following dislocation, the posterior capsulotomy continues from the lesser trochanter across the capsule, releasing the entire ischiofemoral ligament, joining up with lateral capsulotomy, allowing the femoral head to sublux proximally and posterolaterally.

Following exposure, attention should be paid particularly to the anterior margin, removing any osteophytes from the iliopubic recess.

## Intra-Operative Sizing

### Femoral Head Sizing – Neck

Use the Sizing Templates to confirm the implant size that was determined during pre-operative planning.

Place the chosen Sizing Template around the femoral neck as close as possible to the head/neck junction and in the preferred orientation. The largest dimension of the femoral neck is from inferomedial to superolateral. The Sizing Template must be free to move on this widest portion to reduce the risk of notching and allow angular adjustment with the Head Guide. Check 3 sizes of Sizing Template to ensure that the correct size is being selected.

- i Info:** There are 5 double-ended Sizing Templates, with each end marked according to the corresponding H1 Head size.
- i Info:** Using the Sizing Template as a guide, you can use a marker pen or diathermy to score the coronal and sagittal planes of the femoral neck, projecting up onto the femoral head to aid in the positioning and orientation of the Guide Wire later on.
- ⊞ Note:** Exposure of the femoral head must be adequate in order to achieve intended implant placement.

Do not remove non-osteophytic bone.

The chosen Sizing Template must be able to fit round the widest portion of the femoral neck, while being held as close as possible to the head/neck junction in approximately the preferred H1 Head orientation.



## Intra-Operative Sizing

### Femoral Head Sizing – Head

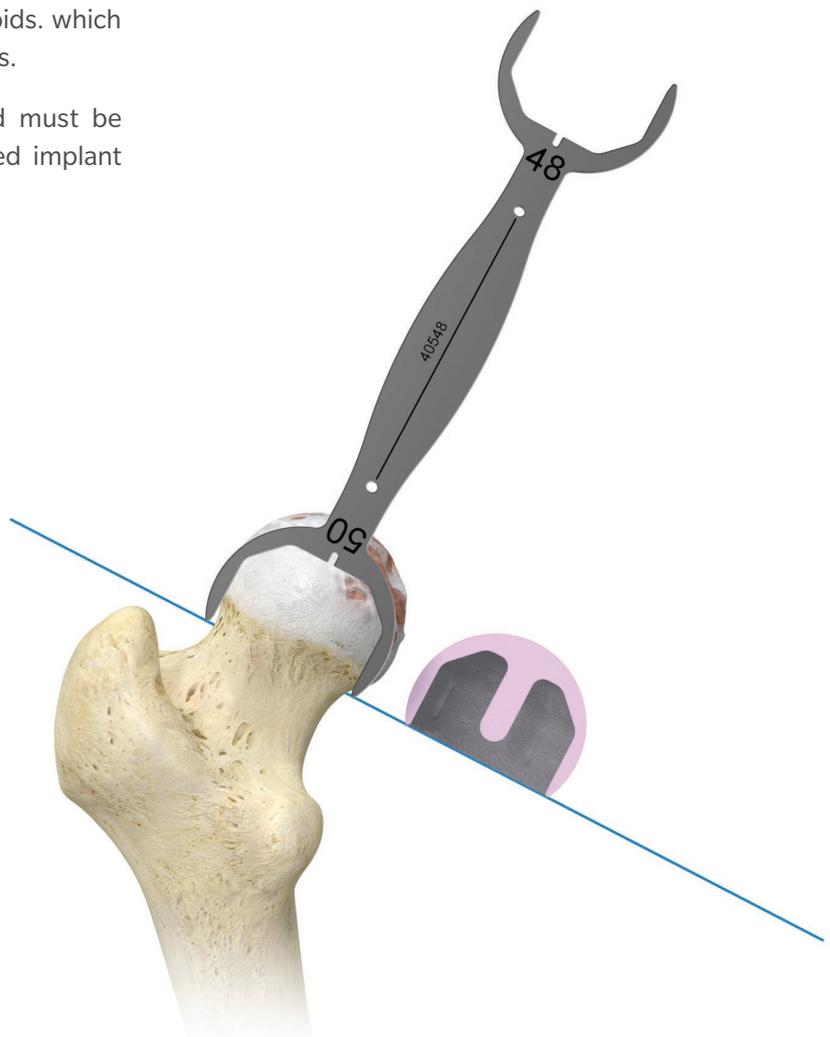
Place the chosen Sizing Template in the preferred implant position.

Its outer surface represents the bearing surface of the H1 Head.

Use the inner surface to check for any voids, which may occur in more severe cam deformities.

ⓘ **Note:** Exposure of the femoral head must be adequate in order to achieve intended implant placement.

Do not remove non-osteophytic bone.



## Femoral Head Preparation

### Adjusting the Head Guide

The Head Guide is a configurable clamp with a positional drill tube. The three jaws of the clamp are configured to the native femoral neck. The clamped position of the Head Guide is driven by the chosen spacing of the inferior jaws, which recreate the reference frame created with the x-ray template. The superior jaw acts solely as a stabilising clamp, positioned to ensure that both inferior jaws are correctly in contact with the neck. The angular position of the drilling tube is set to replicate the planned H1 Head orientation.

For a detailed description of the Head Guide, refer to APPENDIX D.

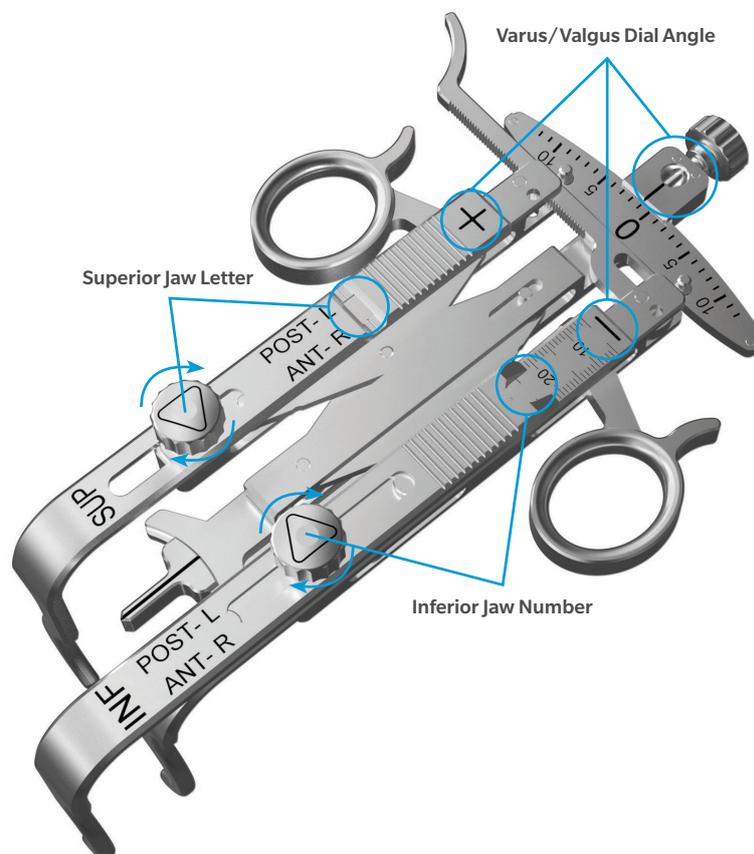
Assemble the correct jaws onto the Head Guide Body.

Using the Number, the Letter and the Angle ascertained during planning, adjust the inferior jaws, the superior jaw and the varus/valgus dial accordingly. Tighten all 3 positions.

Ensure that the Angle is adjusted in the right direction, as indicated by the markings on the jaws:

**+ VALGUS – VARUS**

**Note:** Make sure that the correct jaws are being used for the femoral view and the side of hip.



## Femoral Head Preparation

### Placing the Head Guide

Open the Head Guide fully and place it around the femoral neck, with the upper inferior jaw positioned at the medial head/neck junction and the lower at the furthest most accessible point on the medial/inferior neck. The superior jaw should be positioned on the lateral/superior femoral neck.

Squeeze the handles gently to clamp it into position, ensuring that all 3 jaws are in contact with bone.

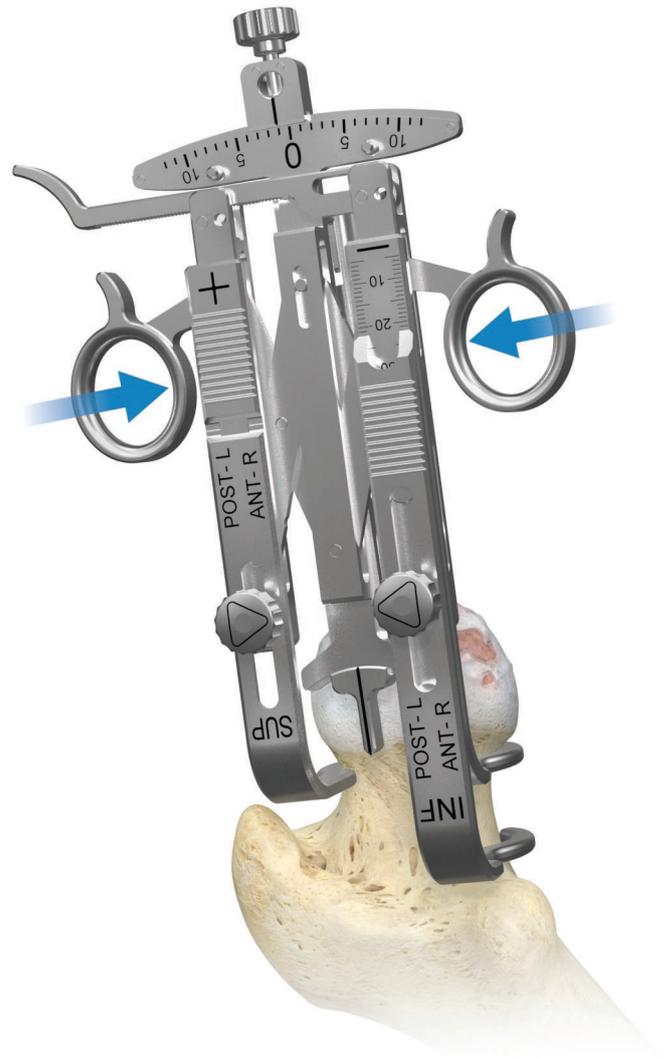
If necessary, tighten by a further one or two clicks. If all 3 jaws are still not in contact, check that the planned settings are still correct; also consider altering the Letter setting until all 3 jaws make contact. This will not require any further alteration to the other Head Guide settings.

Slide the Spiked Tube through the Head Guide tube.

- i Info:** If it is not possible to fit the inferior jaws onto the inferior neck, or multiple positions are available, review the Number that was recorded during planning. Alter the jaw position as required, and then revisit the plan in order to adjust the inferior Ruler accordingly and then record the new Angle.
- i Info:** If you drew lines on the femoral head earlier, and the Head Guide position is very different, review the plan and the placement/stability of the Head Guide before continuing.
- i Info:** If the settings of the jaws need to be adjusted at this stage, remove the Head Guide and adjust the jaws, then replace the Head Guide back onto the femoral neck.
- ⊖ Note:** Ensure that any osteophytes and/or soft tissues that may be preventing the Head Guide from correctly sitting on the neck are fully removed.

Do not over-tighten the Head Guide.

Make sure both inferior jaws are in contact with the inferior femoral neck, otherwise the planned varus/valgus angle will not be achieved.



## Femoral Head Preparation

### Adjusting the Head Guide (anteversion)

The curvature of the Head Guide jaws provide subtle anteversion guidance, but this must be reviewed carefully. Check the anteversion and adjust manually as necessary so that the native anteversion of the femoral neck is parallel to the Spiked Tube.

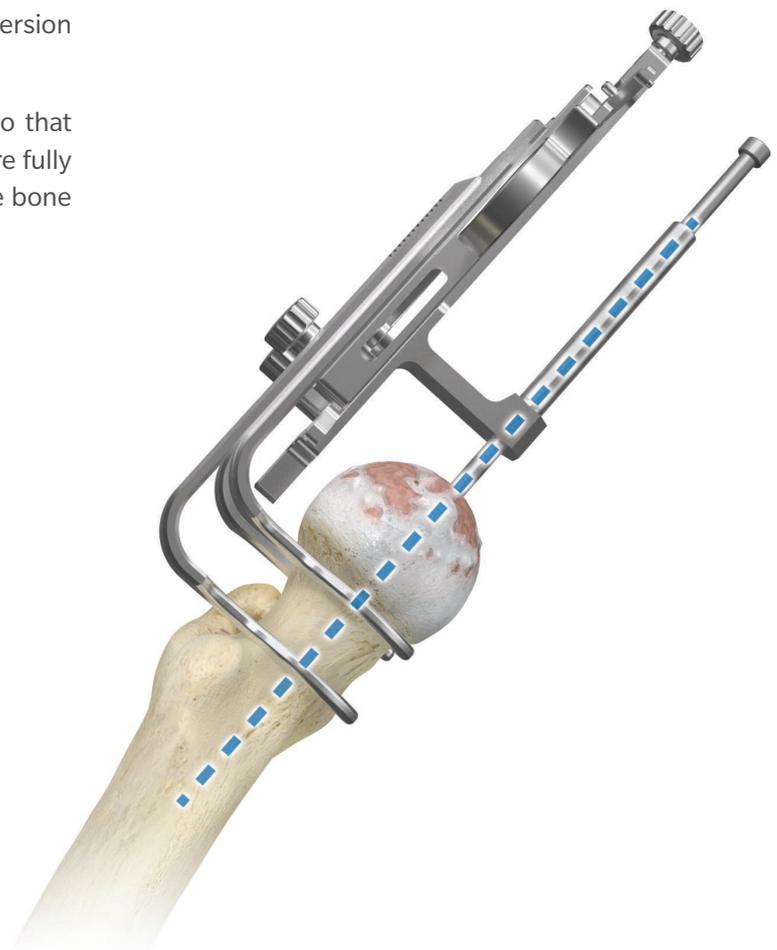
Now tap the teeth of the Spiked Tube through the cartilage and into the bone.

Recheck the anteversion. If necessary, slide the Spiked Tube away from the bone and correct the version manually to ensure the Guide Wire will travel centrally down the femoral neck.

Ensure that the Head Guide is stable.

**Note:** Failure to check and adjust the anteversion may lead to poor implant placement.

Ensure that the Spiked Tube is inserted so that the spikes contact the femoral head and are fully inserted through the cartilage and into the bone on top of the femoral head.



## Femoral Head Preparation

### Checking the Head Guide (varus/valgus)

Hold the Stem Shaft Template up to the femur and use it to show where the Guide Wire will be placed relative to a 140° stem/shaft angle.

If desired, slide the Spiked Tube away from the bone and adjust the insertion point using the varus/valgus dial.

**Note:** The varus/valgus position must be checked before proceeding.



## Femoral Head Preparation

### Bone Stock Check

Set the Stylus to the chosen femoral head size.

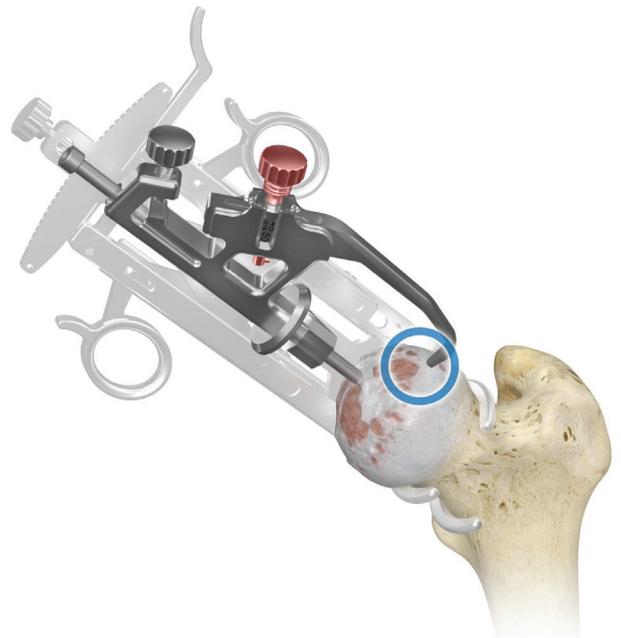
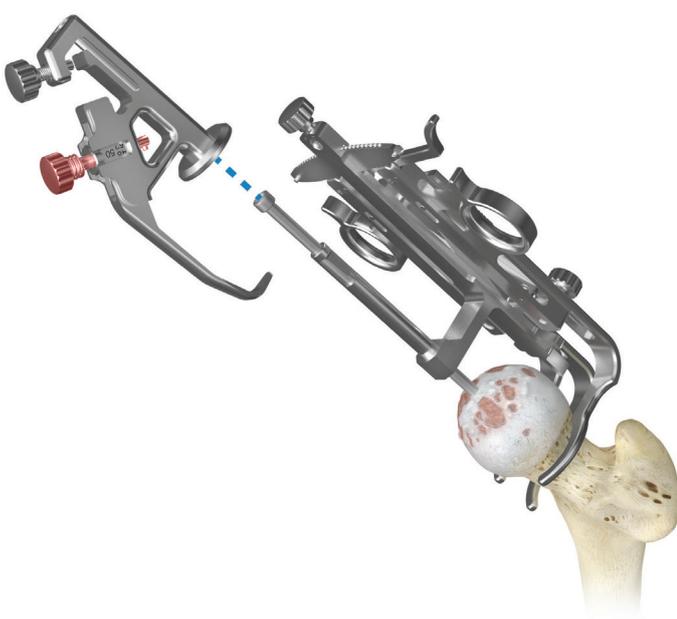
Slide it over the Spiked Tube and Head Guide tube.

Note where the Stylus tip touches the anterolateral head bone and compare to the plan. Adjust the varus/valgus dial now if necessary.

In bad cam hips, the Stylus may only just make contact anterolaterally.

Remove the Stylus.

- i Info:** This step may not be possible in all hips, due to the reach of the Stylus. The definitive check of bone stock is conducted at a later stage, prior to the sleeve cut.
- i Info:** If the settings of the jaws need to be adjusted at this stage, it is easier to remove the Head Guide and adjust the jaws, then replace the Head Guide back onto the femoral neck, and return to Page 21.



## Femoral Head Preparation

### Guide Wire Insertion

When satisfied with the position of the Head Guide, drill the Guide Wire in until the depth marker is approximately aligned with the top of the Spiked Tube.

Remove the Spiked Tube, Release the ratchet and take the Head Guide off the femur, loosening the jaws if necessary to aid its removal. The Guide Wire should remain in place.

Slide the Guide Wire Sleeve over the Guide Wire until it makes contact with the femoral head.

**i Info:** The depth marker on the Guide Wire serves as a guide – when the mark aligns with the top of the Spiked Tube, the length of Guide Wire inside the femur will match the length of the Guide Rod Drill.

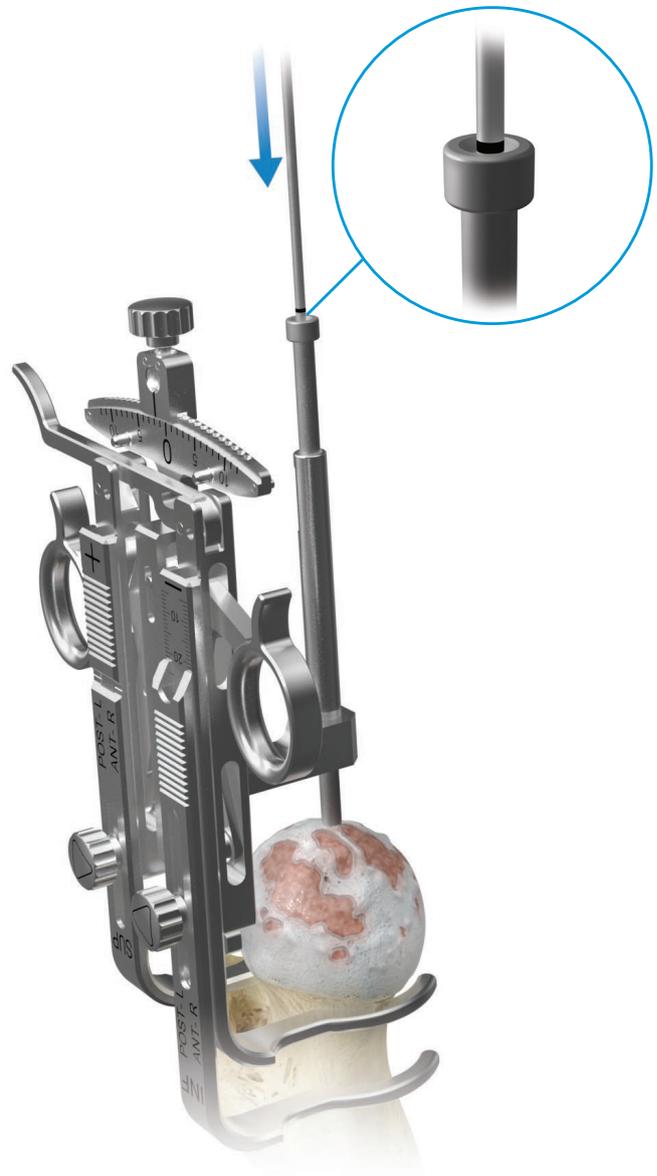
**⊖ Note:** Do not stop drilling until the mark on the Guide Wire is reached.

Stop drilling before going through the lateral cortex.

Take care not to bias the power tool and therefore the Guide Wire during insertion.

Never drill the Guide Wire “freehand”.

Ensure that an appropriate powered pin driver with cannulation is used.



## Femoral Head Preparation

### Stylus: Bone Stock Check

The Stylus is used to confirm the size and position of the H1 Head. It is used first over the Guide Wire, after which changes can be made using the Head Guide if necessary. The Stylus checks are then repeated with the Guide Rod, to confirm that the chosen size and orientation are still satisfactory. The Stylus has 2 locking screws: size and position.

For a detailed description of the Stylus terminology, refer to **APPENDIX E**.

To check that there is adequate femoral head bone stock for the H1 Head, slide the Stylus over the Guide Wire Sleeve ensuring that the size screw is locked to the chosen size and the position screw is unlocked, until the tip of the Stylus reaches the femoral head.

It may have been noted during planning that only a very small amount of bone will be removed anteriorly and laterally; the tip of the Stylus will indicate this.

If this lack of bone stock contradicts the plan, an adjustment of the Head Guide must be made, in order to change the position of the entry point of the Guide Wire posteriorly to optimise implant-bone contact, with a small compensatory reduction in anteversion to avoid notching if necessary.

**i Info:** In very bad cam hips, there may be a small void anterolaterally, but because the H1 Head is cementless, this is acceptable.

**☰ Note:** Make sure the Stylus is set to the chosen femoral head size before making this check.

Make sure the Stylus position screw is unlocked before making this check.

Adequate bone stock must be confirmed using the Stylus before proceeding.



## Femoral Head Preparation

### Stylus: Depth Set

Now slightly loosen the sizing screw on the Stylus so that the selected size setting remains but so that the Stylus tip can be manoeuvred over the femoral head. Lock the sizing screw once the Stylus tip is over the femoral head.

Move the Stylus up the Guide Wire Sleeve until the tip is sitting at the inferior/medial head/neck junction. Now make sure that the Guide Wire Sleeve is in contact with the femoral head.

This position of the Stylus tip should reflect the H1 Head position chosen during the planning process and should ensure that the H1 Head is positioned with the implant covering all machined bone.

Now tighten the position screw so the Stylus is fixed to the Guide Wire Sleeve.

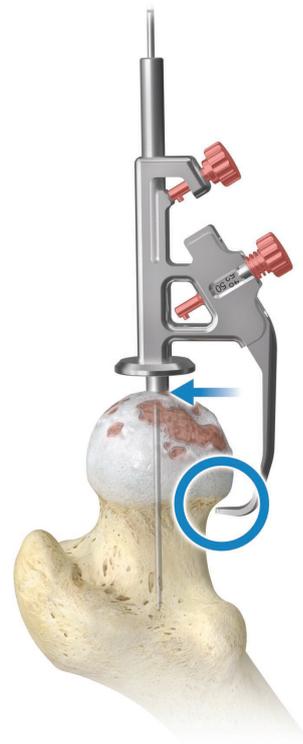
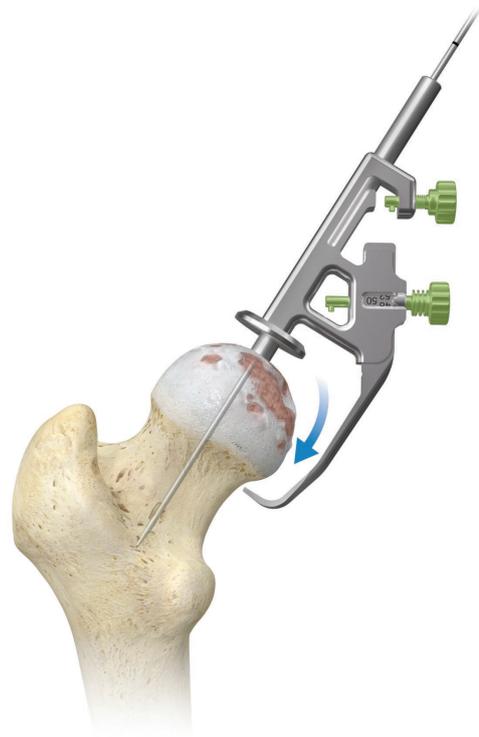
**i Info:** The gap between the femoral head and the Stylus disc is an indication of which Spacer will be needed later on.

**⊖ Note:** Check contact between Guide Wire Sleeve and bone before locking Stylus.

**⊖ Note:** Do not force the Stylus tip over the femoral head without unlocking the sizing screw.

Ensure that:

- The Guide Wire Sleeve is in contact with the femoral head when setting the medial/inferior depth.
- The Stylus remains locked to the Guide Wire Sleeve.
- There is adequate visibility of the head/neck junction and the anterolateral neck.
- The correct size setting on the Stylus remains selected (the sizing screw is tight).



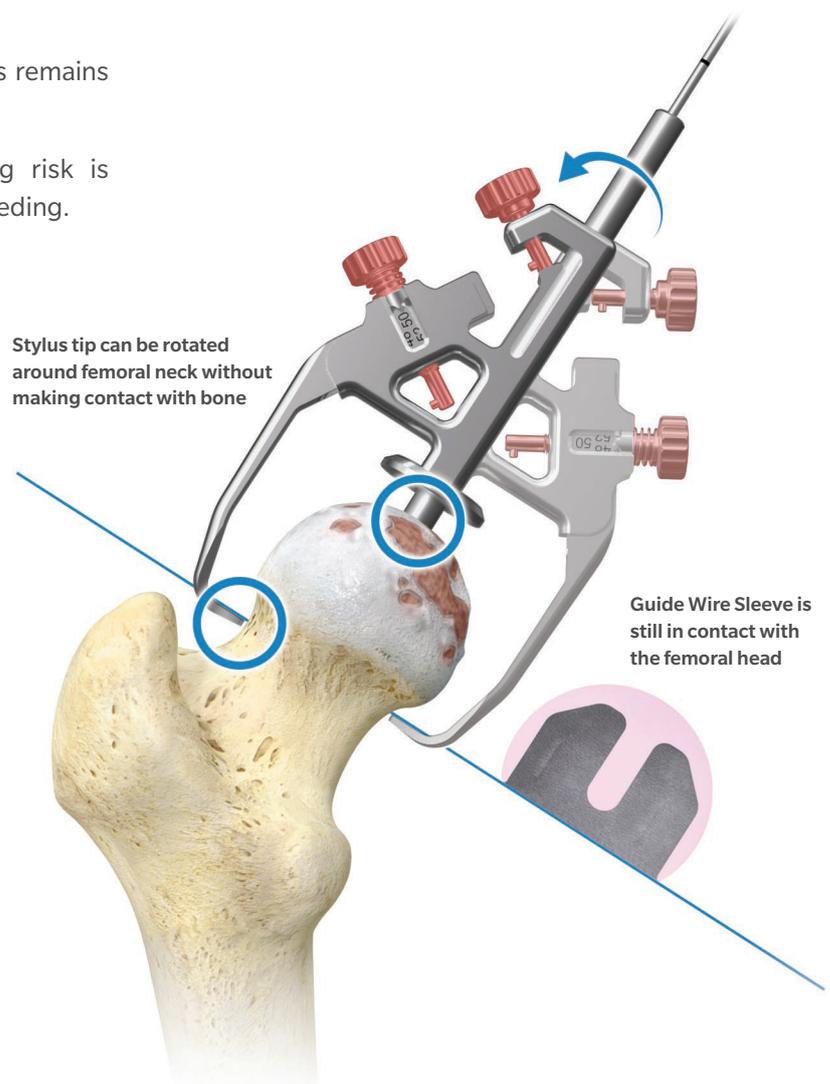
## Femoral Head Preparation

### Stylus: Notching Check

Once happy with the medial position, swing the Stylus round to check for superior/lateral notching, ensuring that the Guide Wire Sleeve is in contact with the femoral head bone during the check.

**Note:** To ensure that the rim of the H1 Head Implant is correctly represented by the tip of the Stylus, make sure that:

- The Guide Wire Sleeve is in contact with the femoral head when checking for notching.
- The Stylus remains locked to the Guide Wire Sleeve.
- There is adequate visibility of the head/neck junction and the anterolateral neck.
- The correct size setting on the Stylus remains selected (the sizing screw is tight).
- Implant depth is set and notching risk is checked with the Stylus before proceeding.



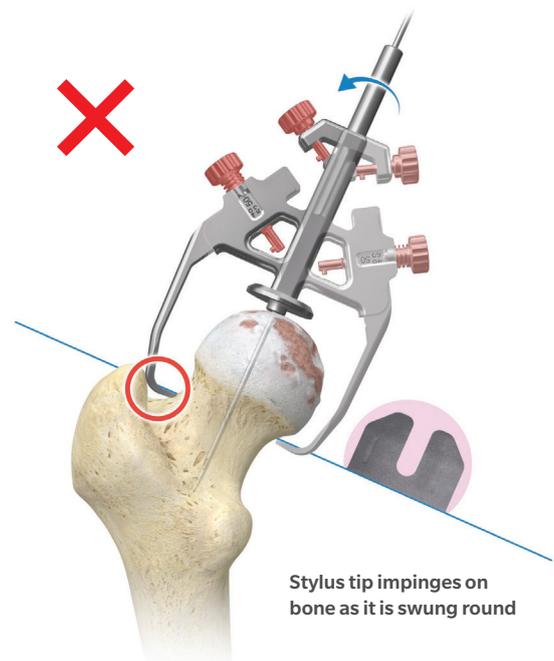
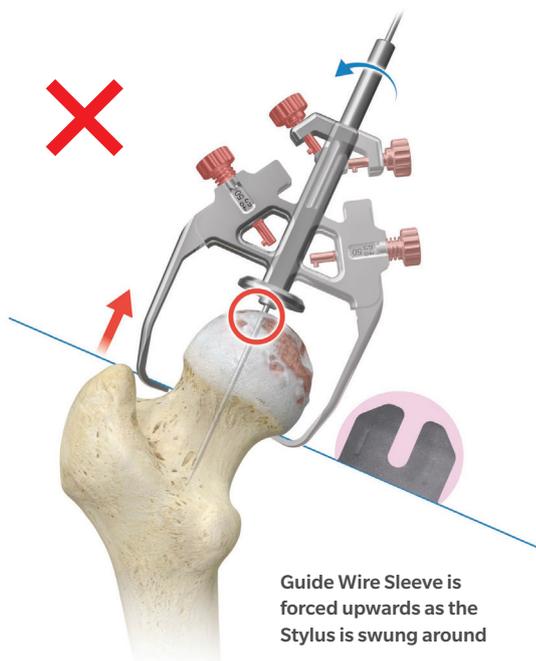
## Femoral Head Preparation

### Stylus: Notching Check (Cont.)

If the checks indicate that there may be notching or the preferred H1 Head position cannot be achieved, reposition the Head Guide over the Guide Wire, tighten into place, remove the Guide Wire, and then adjust the entry position or angulation to improve the bony contact or avoid notching, whilst maintaining adequate valgus. Then reinsert the Guide Wire and then repeat the check/set/check sequence of steps.

**Note:** Ensure that:

- The Guide Wire Sleeve is in contact with the femoral head when checking for notching.
- The Stylus remains locked to the Guide Wire Sleeve.
- There is adequate visibility of the head/neck junction and the anterolateral neck.
- The correct size setting on the Stylus remains selected.
- Implant depth is set and notching risk is checked with the Stylus before proceeding.



## Femoral Head Preparation

### Guide Rod Drilling

Once satisfied with the Guide Wire position, loosen the position and size screws and remove the Stylus and Guide Wire Sleeve.

Drill the Guide Rod Drill over the Guide Wire until the stop is reached on top of the femoral head, then remove the Guide Rod Drill and the Guide Wire.

Insert the Guide Rod fully so that the shoulder of the Guide Rod sits on the articular surface of the femoral head.

**Note:** Do not stop drilling until the flange of the drill touches the femoral head.

Ensure that an appropriate power tool with cannulation and the correct type of chuck is used, with it set to “ream”.



## Femoral Head Preparation

### Stylus: Check/Set/Check

Now slide the Stylus over the Guide Rod and make sure the Guide Rod placement is acceptable before proceeding with the Spacer choice and cutting steps by performing the following checks:

1. Bone Stock Check
2. Inferior/medial depth set and Stylus lock
3. Superior/lateral notch check

**Note:** The Stylus must be used to perform these checks before proceeding.

To ensure that the rim of the H1 Head Implant is correctly represented by the tip of the Stylus, make sure that the Stylus remains locked to the Guide Rod during the inferior depth set and superior notching check.

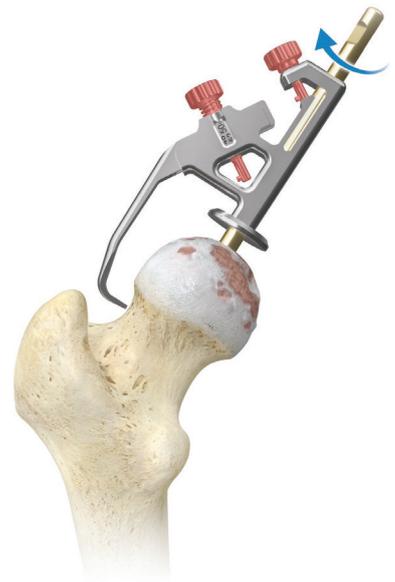
1. Bone Stock Check



2. Inferior/medial depth set Stylus lock



3. Superior/lateral notch check



## Femoral Head Preparation

### Sleeve Cut – Spacer Choice

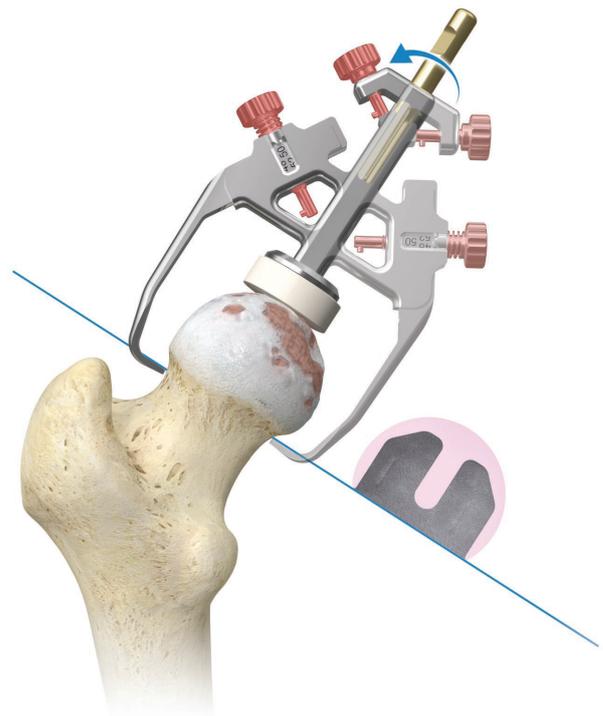
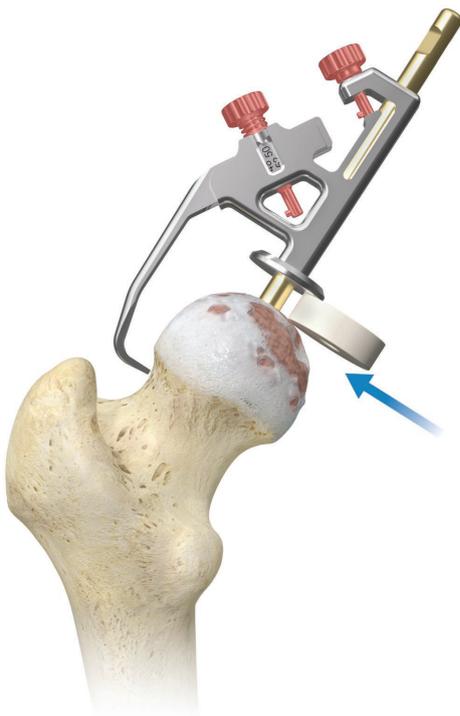
With the Stylus still locked in place on the Guide Rod, choose a Spacer that fills the gap between the bone and the Stylus disc.

Once happy with the choice of Spacer, remove the Stylus. Slide the chosen Spacer over the Guide Rod, replace the Stylus and repeat the depth and notching checks with the Spacer in position. Once satisfied, remove the Stylus.

**i Info:** There are 8 Spacers, going from 4 to 18 in 2mm increments.

**⊖ Note:** A Spacer must be used at this stage to ensure correct Sleeve Cutter depth.

The Spacer must fill the gap between the Stylus disc and bone.



## Femoral Head Preparation

### Sleeve Cut

Select the correctly sized Sleeve Cutter and perform the sleeve cut.

**i Info:** Start the power tool with the Sleeve Cutter away from the bone, then advance slowly down the Guide Rod.

The Sleeve Cutter will reach as far as the Stylus tip indicated in previous steps. If you think the cut needs to go further, slide a thinner Spacer onto the Guide Rod, repeat the Stylus checks and then repeat the sleeve cut.

Now remove the Guide Rod, which may be held tightly in the bone. Place the Puller slot over the end of the Guide Rod and cover with your thumb. Twist the Puller from side to side and pull simultaneously to gradually remove the Guide Rod from the bone.

**⊖ Note:** Do not stop cutting too early – the Sleeve Cutter must bottom out on the Spacer.

Do not push too hard while cutting. Pushing hard will generate more heat and result in less accuracy.

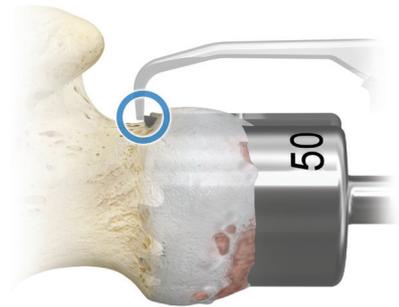
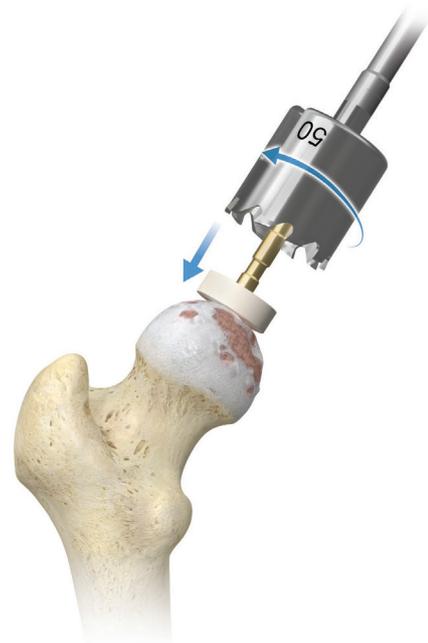
Do not carry on cutting once the stop has been reached.

Re-check with the Stylus before changing the Spacer to avoid notching.

Ensure that an appropriate power tool with the correct type of chuck is used, with it set to “ream”.

Ensure that the Guide Rod is fully engaged in the Puller’s slot before extraction.

Use only the Puller to remove the Guide Rod.



## Femoral Head Preparation

### Flat Cut

Use the tip of the Guide Wire to pinpoint where the inferior rim of the Sleeve Ring should sit: on the medial cortex, slightly beyond the cut region of bone.

Select the correctly sized Sleeve Ring and slide it over the femoral head until it makes contact with the Guide Wire. The lower rim of the Sleeve Ring represents where the H1 Head will sit once implanted.

Tighten the Sleeve Ring Screw. Now observe or palpate the lower rim of the Sleeve Ring to check that it is overlapping the cut cortical bone.

**Note:** Ensure that:

- Correct size of Sleeve Ring is used.
- Sleeve Ring Screw is secure in bone.
- Sleeve Ring is covering all machined bone.



## Femoral Head Preparation

### Flat Cut (Cont.)

Drive one or two Drill Pins to improve stability of the Sleeve Ring if necessary.

Perform the flat cut with an oscillating or reciprocating saw blade until the bone is level with the Sleeve Ring, then remove the Sleeve Ring.

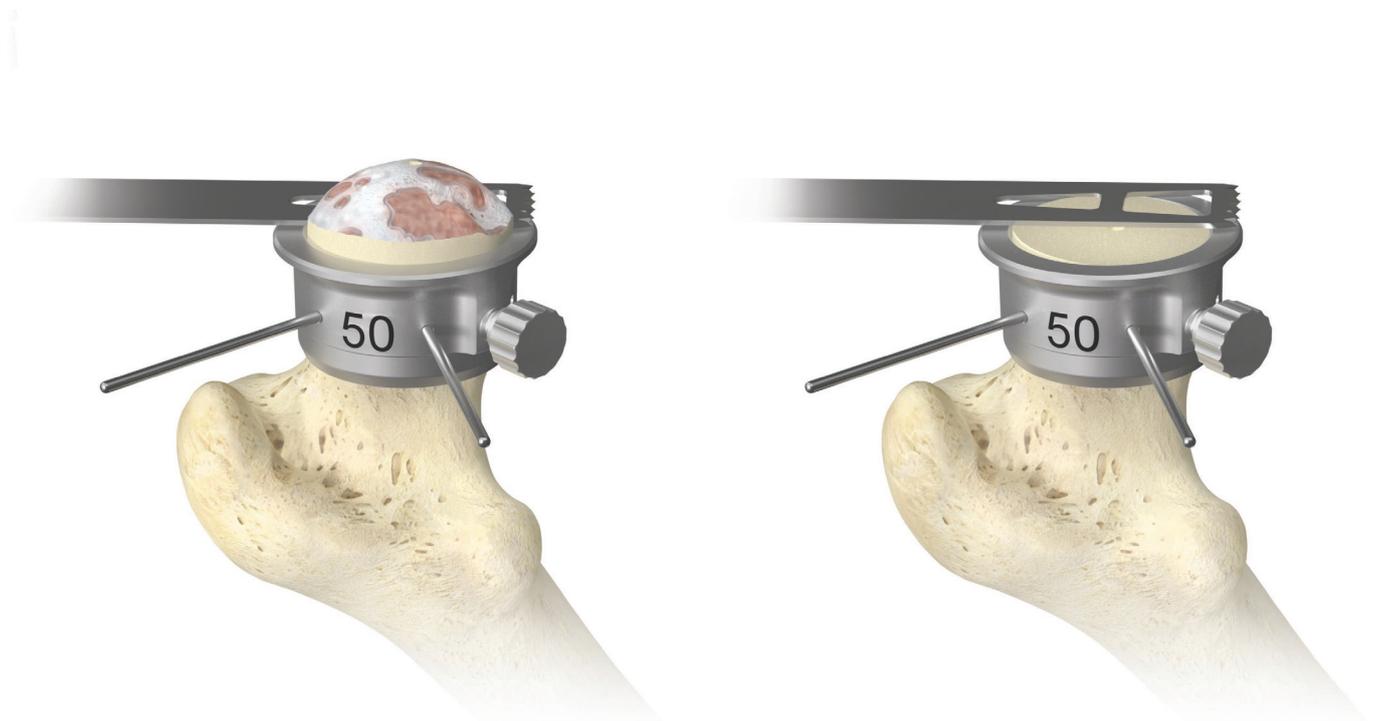
Now reinsert the Guide Rod. Depending on how much bone has been cut off the top of the femoral head, the Guide Rod may reach the end of the bone tunnel before its shoulder reaches the flat of the femoral head – the chamfer cut won't be adversely affected if this happens.

**Note:** Ensure that the Sleeve Ring is stable before proceeding with the flat cut.

If Drill Pins are used, use a pin driver to insert them.

Make sure the saw blade passes from one side of the Sleeve Ring to the other, without digging into the bone or bending upwards.

Ensure the cut surface is flat and level with the Sleeve Ring surface. Remove any raised asperities before proceeding.



## Femoral Head Preparation

### Chamfer Cut

Select the correctly sized Chamfer Cutter and Cap. Slide the Chamfer Cutter Cap into position until it clips into place.

Gently advance the Chamfer Cutter down the Guide Rod to perform the chamfer cut.

**i Info:** Start the power tool with the Chamfer Cutter away from the bone, then advance slowly down the Guide Rod.

Check that a radius between the chamfer and the flat cut has been fully formed by the Chamfer Cutter. If it is not present, repeat the chamfer cut.

**⊞ Note:** Check that the radius is fully formed

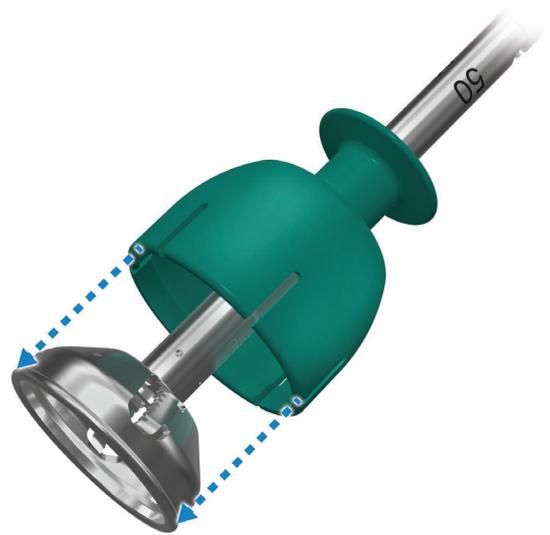
**⊞ Note:** Do not stop cutting too early – the Chamfer Cutter must bottom out on the top of the femoral head.

Do not push too hard while cutting. Pushing hard will generate more heat and result in less accuracy.

Do not carry on cutting once the stop has been reached.

The Chamfer Cutter Cap must be used.

Ensure that an appropriate power tool with the correct type of chuck is used, with it set to “ream”.



## Femoral Head Preparation

### Head Trialing

Select the correctly sized Head Trial and slide it down the Guide Rod. Confirm that the rim of the Head Trial covers the machined bone.

Spin the Head Trial around and use the window to check that the cut surface is as planned. Once satisfied with the position of the Head Trial, mark the bone just beneath the rim using a pen or diathermy so that the seating of the head implant can be confirmed later.

**i Info:** In very bad cam hips, there may be a small void anterolaterally, but because the H1 Head is cementless, this is acceptable.

If the acetabulum has not yet been prepared, leave the Head Trial in place. Otherwise, remove it now and proceed to head implantation. Remove the Guide Rod for the last time, using the Puller again if needed.

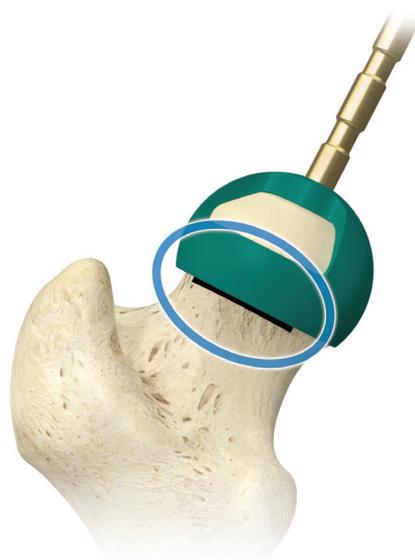
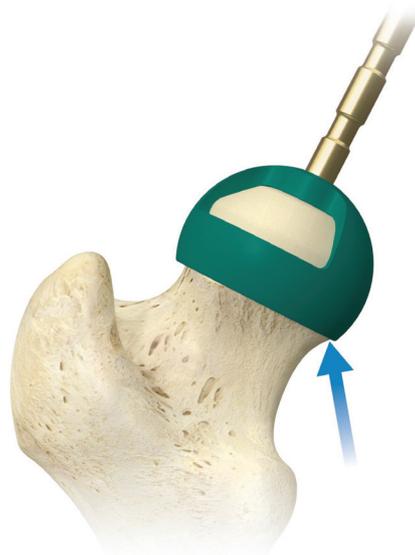
**⊖ Note:** The Head Trial must be used.

Checks must be made for exposed machined/cancellous bone. If there is any exposed machined bone then the flat cut and chamfer cut must be repeated.

A mark must be made so that the final implant position can be checked.

Ensure that the Guide Rod is fully engaged in the Puller's slot before extraction.

Use only the Puller to remove the Guide Rod.



## Acetabular Preparation

### Reaming

The size and positioning of the H1 Cup should have been planned, based upon the H1 Head.

The true external diameter of the H1 Cup is approximately 0.5 mm greater than the labelled size. This true size includes the average thickness of the VPS coating. 57 cup example:



Under-reaming is required for adequate press-fit. Having confirmed the H1 Cup size, start with a Reamer 3 mm below this size (or at a smaller size if that is preferred, particularly if the acetabulum is being deepened).

The final ream before the trialling stage must be 1mm under the stated H1 Cup size.

**i Info:** The Retractor Nail can be placed in the ilium to aid with incision of the capsule around the hip joint and/or it can be placed into the ischium to aid with soft tissue retraction to achieve a clear unrestricted view of the acetabulum.

**ⓘ Note:** Pre-op planning must be done for cup depth guidance.

The final ream before trialling must be 1 mm under the stated H1 Cup Size.

Do not ream too deep – consult the pre-op plan.

Use standard hemispherical reamers.

## Cup Trialling

### Connecting to the Cup Impactor

The Cup Impactor and Cup Impactor Cassette are assembled together and connect to the Cup Trial, Cup Impaction Cap and Rim Impactor.

For a detailed description of how the Cup Impactor works, refer to **APPENDIX F**.

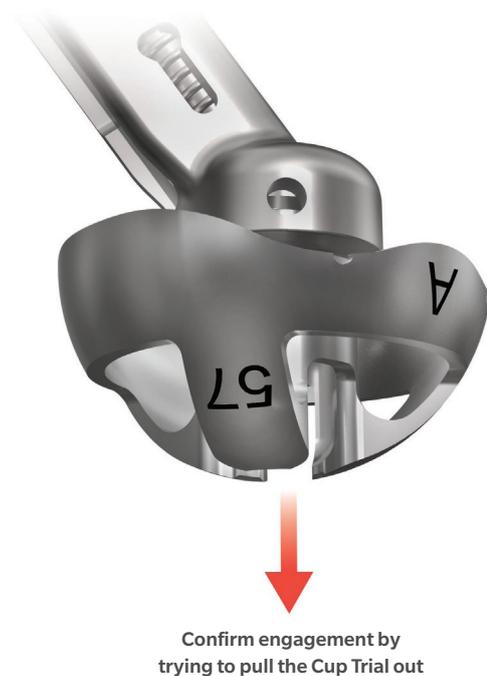
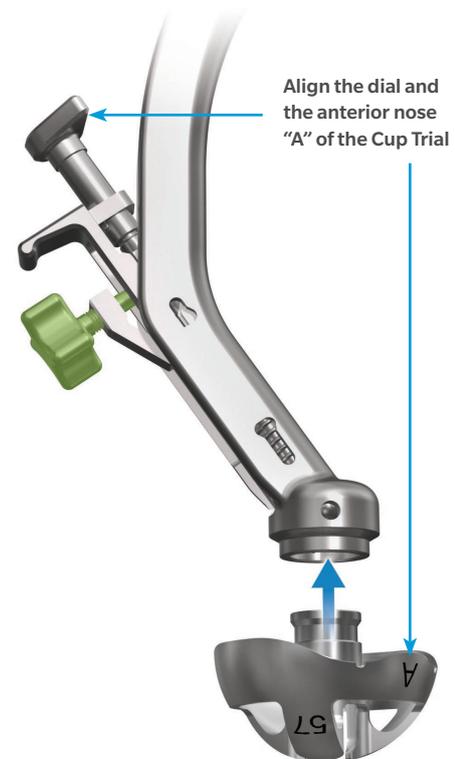
Assemble the Cup Impactor Cassette into the Cup Impactor. Select the correctly sized Cup Trial.

With the rotation lock of the Cup Impactor in the loose position, align the anterior “nose” (marked A) of the Cup Trial with the point of the rotation dial and push it onto the end of the Cup Impactor until it clicks into place.

Rotate the Cup Trial until in approximately the correct rotational position, taking into account the positioning of the offset, the approach and whether it is a right or left hip.

The anterior nose should be positioned approximately 12° inferior to the true anterior position.

**Note:** Confirm that the Cup Trial is secured correctly to the Cup Impactor by trying to pull it away. If it comes off, it is not secure!



## Cup Trialling

### The Aerials

There are 2 Aerials for 2 different patient positions:  
Supine and Lateral

Version guidance is 20° and inclination guidance is 45°.

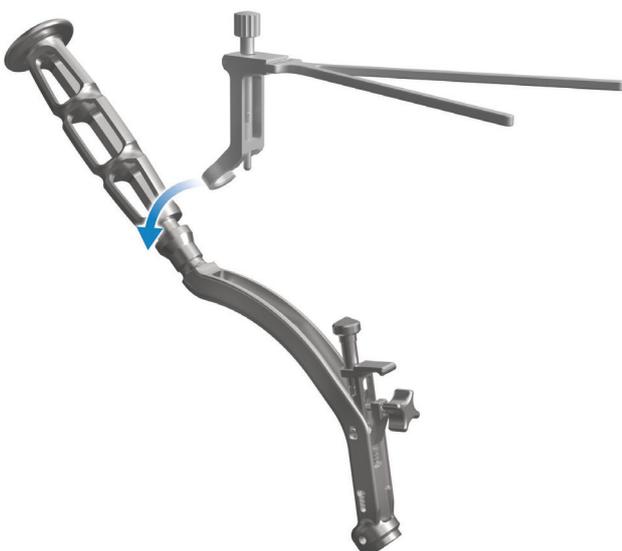
Refer to APPENDIX G for a detailed description of the guidance provided by the Aerials.

Plug the chosen Aerial into the Aerial Hub.

Hook the Aerial Hub around the Cup Impactor and tighten into position.

ⓘ **Note:** Make sure the correct Aerial is used according to the patient's position.

The Aerial must be used for inclination and anteversion guidance.



## Cup Trialling

### Rotation Adjustment

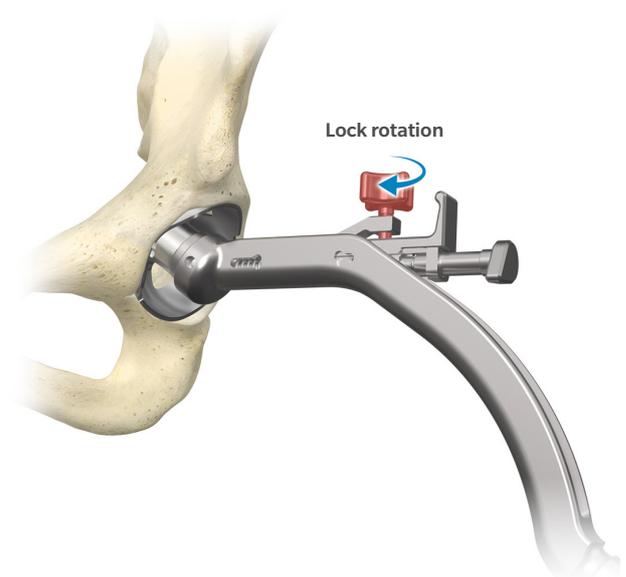
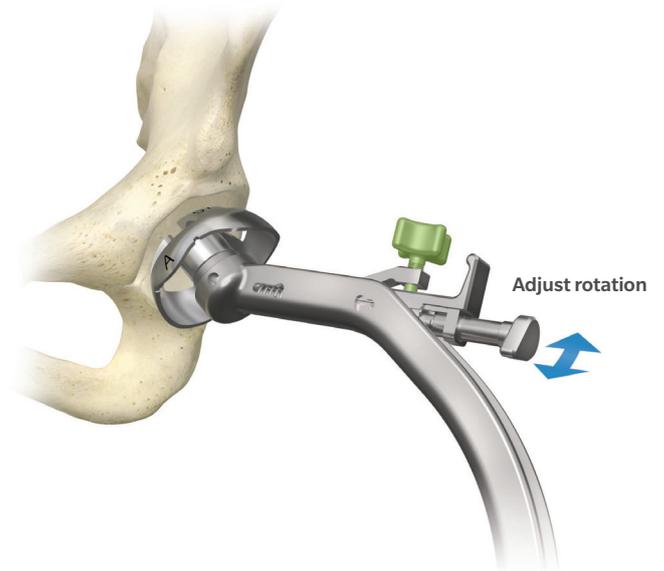
Introduce the Cup Trial towards the prepared acetabulum.

As you advance the Cup Trial, make small adjustments of the rotation as required, using the rotation dial, while ensuring that the Aerial is in approximately the correct orientation by adjusting the Cup Impactor's position.

Once satisfied, lock the rotation. This locked rotation will ensure that the definitive H1 Cup will be inserted at the same rotation.

**Note:** The Cup Trial must be used.

Exposure of the acetabulum must be adequate in order to achieve intended implant placement.



## Cup Trialling

### Depth and Press-Fit Checks

Push the Cup Trial until it bottoms out (use a mallet if necessary). Check the depth of the Cup Trial. If the reaming is not deep enough, go back and ream a bit more with the final reamer, while referring to the x-ray. The depth of the Cup Trial will be replicated by the H1 Cup.

The Cup Trial is sized such that it should be seated with light tapping alone and should resist removal. If the Cup Trial feels too tight, re-ream with the same size reamer employing a “rocking” action to remove asperities and to create a smooth cavity. If the Cup Trial feels loose, reduce the reamer size by 1mm and ream centrally, deepening by 1mm. Repeat the Cup Trial insertion after any re-reaming.

Check the rotation again. If it needs adjusting, remove the Cup Impactor and Cup Trial, unlock the rotation, adjust by the desired amount, replace the Cup Trial into the socket and lock the rotation once satisfied.

Re-check the anteversion and inclination.

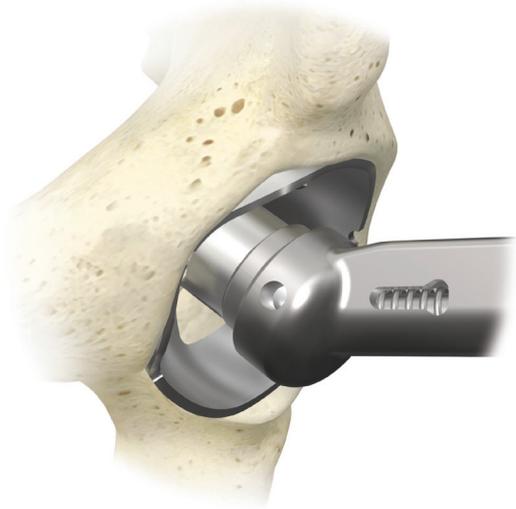
**Note:** All of the following must be checked during cup trialling:

- Depth
- Press-fit
- Rotation, anteversion and inclination

Insufficient reamed depth



Satisfactory reamed depth



## Cup Trialling

### Marking the Position

With your index finger on the release lever ①, unlock the Cup Impactor from the Cup Trial and withdraw the Cup Impactor ② leaving the Cup Trial in situ. Inspect and palpate the rim of the Cup Trial, particularly around the ilio-pubic interval. If the Cup Trial position is not satisfactory, repeat the previous steps as required until satisfied.

Make a mark on the rim of the acetabulum using diathermy next to one of the 3 notches on the Cup Trial.

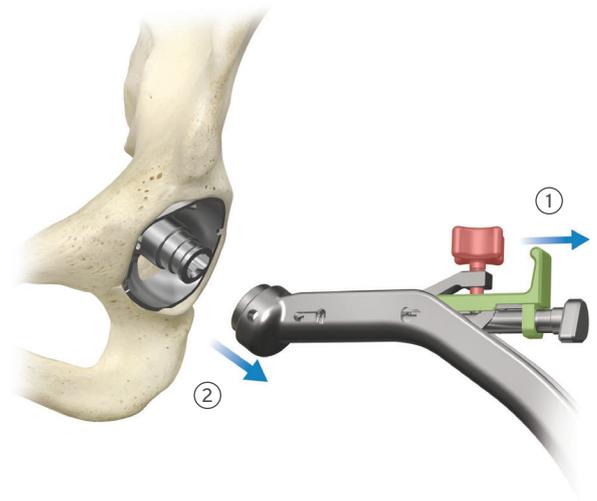
⊖ **Note:** Make mark

To remove the Cup Trial, align the dial of the Cup Impactor with the “anterior nose” of the Cup Trial, push the Cup Impactor into the Cup Trial until it clicks into place and then remove the whole assembly from the acetabulum.

⊖ **Note:** A mark must be made to aid in H1 Cup placement later on.

Take care not to move the Aerial or rotational position between trialling and impaction.

Do not remove the Aerial between now and impaction of the H1 Cup.



## Cup Impaction

### The Cup Impaction Cap

The Cup Impaction Cap comes in two parts:

1. Body
2. Seal

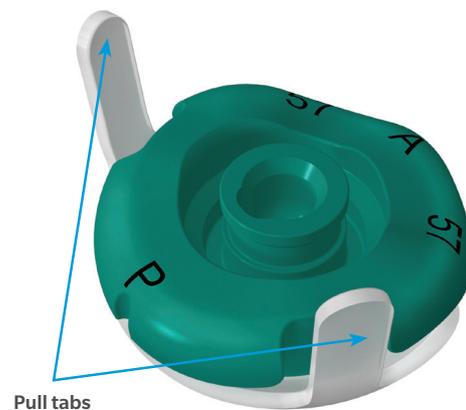
Both parts come in 10 sizes to match the H1 Cup. The two parts must be assembled before use. Together with some sterile saline, the silicone seal creates a hydraulic seal, connecting the H1 Cup to the Cup Impaction Cap.

The Cup Impaction Cap is contoured to match the Cup Trial and the H1 Cup.

**i Info:** Align the pull tabs of the seal with the cut-outs on the body to help with correct alignment.

**☰ Note:** Ensure that the sizes of the Body and Seal match.

Do not use the Cup Impaction Cap body without its corresponding seal.



## Cup Impaction

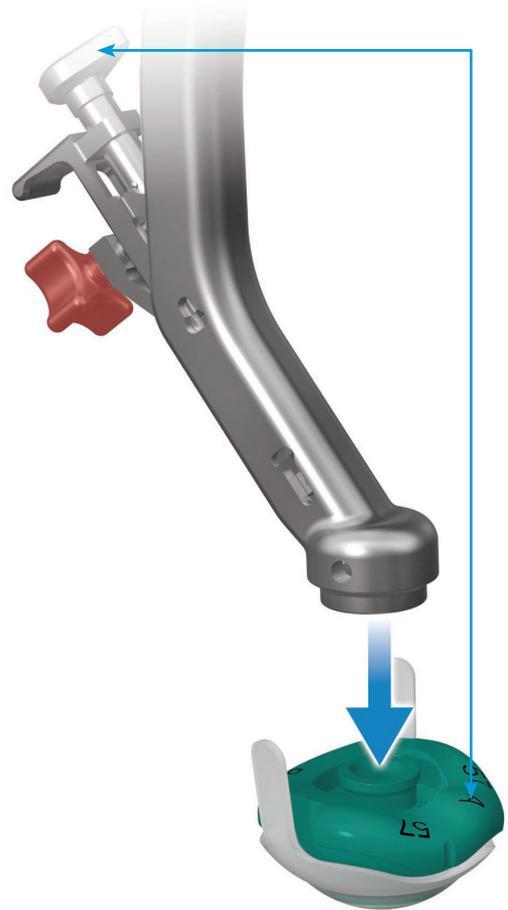
### The Cup Impaction Cap (Cont.)

Keeping the Cup Impactor's rotation dial locked, take the assembled Cup Impaction Cap and align its anterior nose "A" with the point of the rotation dial, then push the Cup Impaction Cap onto the end of the Cup Impactor until it clicks into place.

Open the definitive H1 Cup. Place it on a level, sterile surface. Fill the cup so that it is around half full with sterile saline.

- ⓘ **Note:** Confirm that the Cup Impaction Cap is secured correctly to the Cup Impactor by trying to pull it away. If it comes off, it is not secure!
- ⓘ **Note:** The seal must be checked before lifting the H1 Cup in preparation for impaction.

The seal is reusable – do not dispose after use!



## Cup Impaction

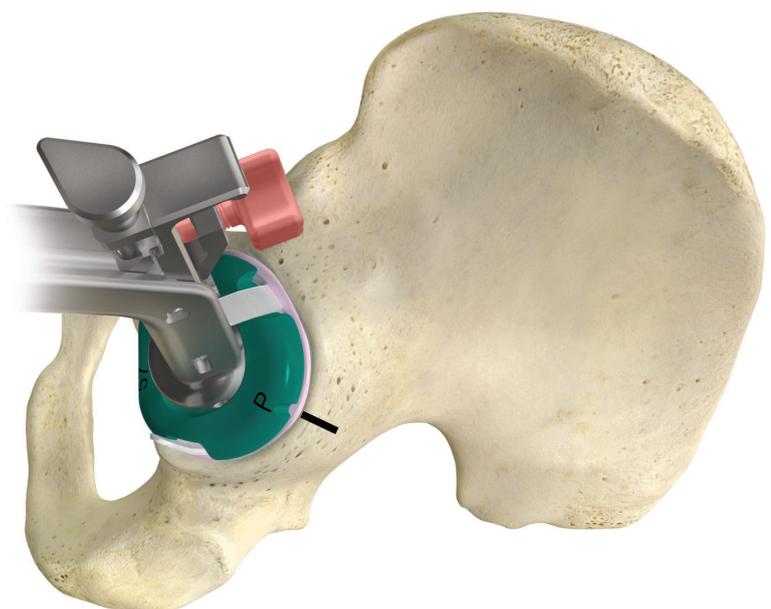
### The Cup Impaction Cap (Cont.)

Push the Cup Impaction Cap into the H1 Cup until the seal forms, taking care to align the contours of the Cup Impaction Cap with those of the H1 Cup. Confirm that the seal has been made by picking up the assembly and checking right round the contoured rim, making sure that the contours of the Cup Impaction Cap are aligned to those of the H1 Cup.

Introduce the H1 Cup into the prepared acetabulum, aligning the correct notch on the Cup Impaction Cap with the mark that was made earlier to ensure correct rotational position.

- ⓘ **Note:** Align the correct notch of the Cup Impaction Cap with the mark made on the bone.
- ⓘ **Note:** The seal must be checked before lifting the H1 Cup in preparation for impaction.

The seal is reusable – do not dispose after use!



## Cup Impaction

### Final Checks and Impaction

Check that the appropriate Aerial is still indicating the intended inclination and anteversion angles. Give the Cup Impactor a firm push so that the H1 Cup is grossly stable.

Do a final check of rotation, inclination and anteversion. When satisfied, use a mallet to impact the H1 Cup. Use the release lever to unlock the Cup Impactor, then withdraw it, leaving the Cup Impaction Cap in situ.

**i Info:** There will be a noise and feel change to the impact as the H1 Cup is seated.

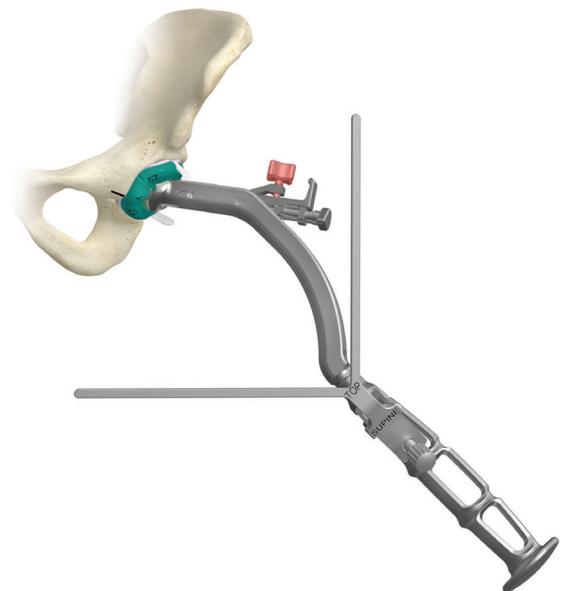
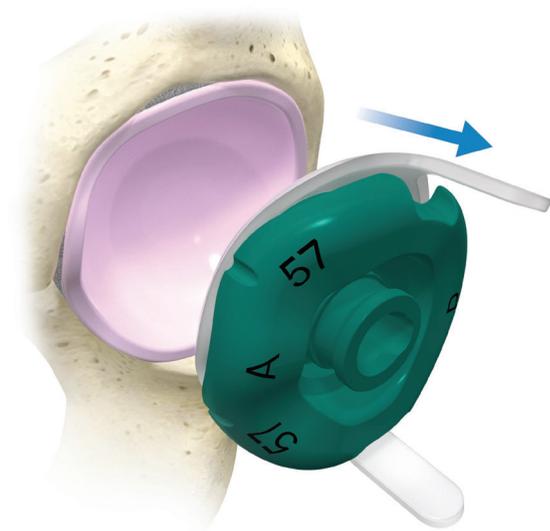
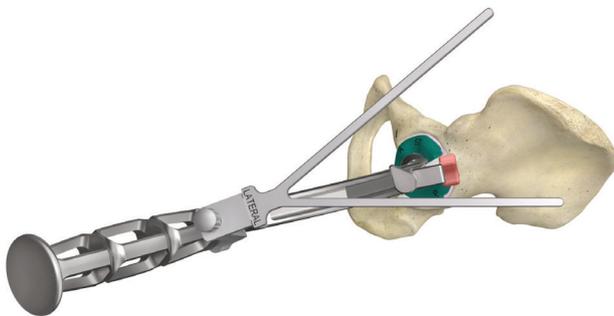
This presents another opportunity to check the depth, inclination and anteversion positions of the H1 Cup. If the positions look good, remove the Cup Impaction Cap by pulling on one of the tabs with your forefinger and thumb – the seal will release without a great amount of force.

**⊖ Note:** Do not stop impaction of the H1 Cup before seating is detected.

Do not continue to impact the H1 Cup once seating has been detected.

The pull-tab must be used to remove the Cup Impaction Cap from the H1 Cup.

Do not use any toothed instrument to pull on the silicone pull-tab.



## Cup Impaction

### Adjustment and Re-Impaction

Careful inspection should now be made of the entire rim, ensuring that the H1 Cup is fully seated and the planned and trialled position is achieved.

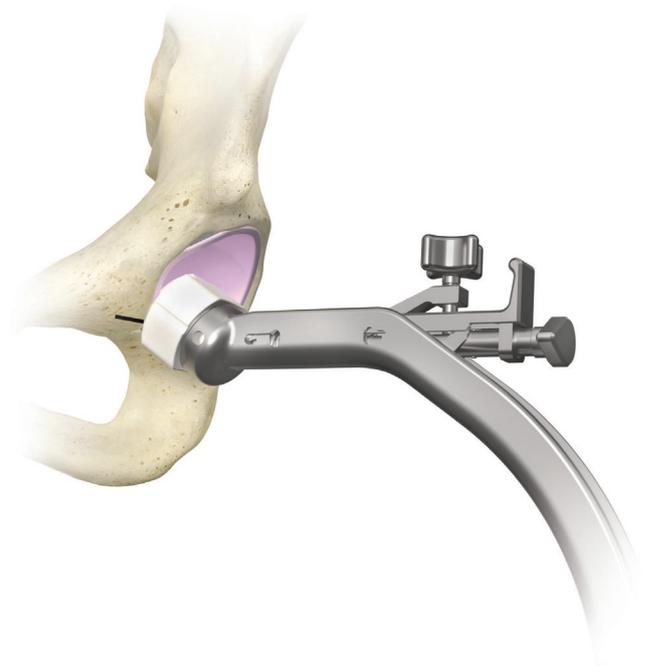
The position of the H1 Cup can be adjusted in a number of different ways, as follows:

- If the H1 Cup is not sitting deep enough, it must be re-impacted using the Cup Impaction Cap and Cup Impactor
- If the H1 Cup does not feel as if it is stable, it should be removed completely by gentle tapping on its rim with the Rim Impactor and Cup Impactor until it capsizes, allowing any soft tissue to be removed, or further reaming to be undertaken as necessary.
- If the version or inclination of the H1 Cup is not satisfactory, it can be adjusted by tapping on its rim with the Rim Impactor and Cup Impactor until it is in the preferred position. If such an adjustment is made, the H1 Cup must be re-impacted to ensure that it is fully seated in the new position.

ⓘ **Note:** Confirm that the Rim Impactor is secured correctly to the Cup Impactor by trying to pull it away. If it comes off, it is not secure!

ⓘ **Note:** Only the Rim Impactor may be used for adjustment of the seated H1 Cup.

If adjustment is made using the Rim Impactor, the H1 Cup must be re-impacted to ensure correct seating.



## Stem Drilling

### Trial Reduction and Stem Drilling

If they were used, remove the Retractor Nails using the Puller.

Reduce the femoral head with the Head Trial in place into the H1 Cup to check ROM and joint laxity.

Check that the mark made at the rim of the Head Trial earlier is still acceptable.

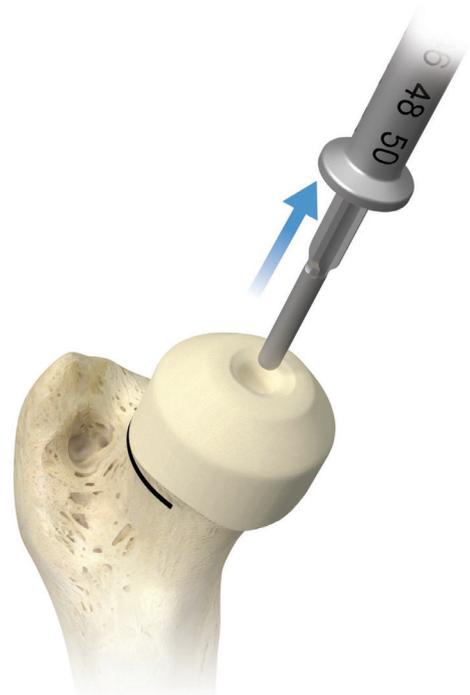
Remove the Head Trial. Select the correctly sized Stem Drill and overdrill the Guide Rod hole, ensuring that the flange seats fully on top of the femoral head, indicating that the stop has been reached.

⊖ **Note:** Always use the Stem Drill.

⊖ **Note:** Make sure the correct Stem Drill is used.

Do not carry on drilling once the Stem Drill flange hits the femoral head.

Do not stop drilling before the Stem Drill flange hits the femoral head.

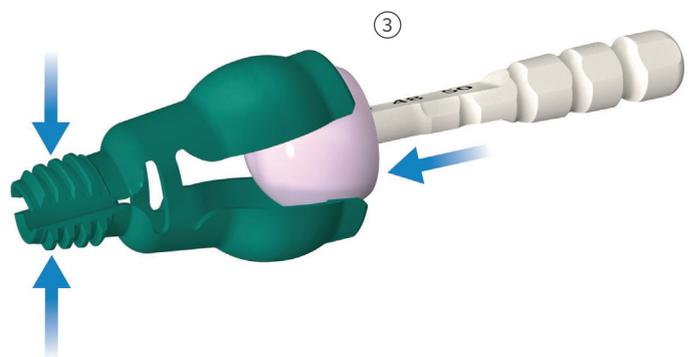
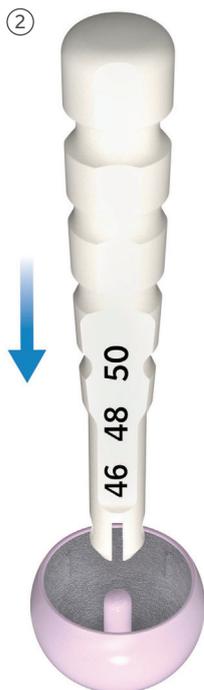


## Head Impaction

### Head Loading

The H1 Head's short stem does not help with alignment, so the Head Impaction Cap is designed to help impact the H1 Head in the intended orientation, guiding the impaction down the cylinder of bone made by the Sleeve Cutter. The following steps must be taken to load the H1 Head onto the Head Impaction Cap.

1. Open the definitive H1 Head implant and place it on a sterile surface or hold it in your hand.
2. Load the H1 Head onto the correctly sized Head Loader.
3. Squeeze the correctly sized Head Impaction Cap open and insert the H1 Head.



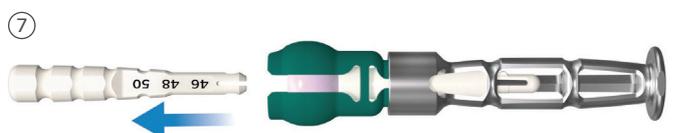
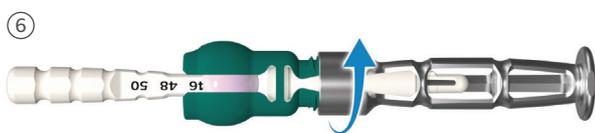
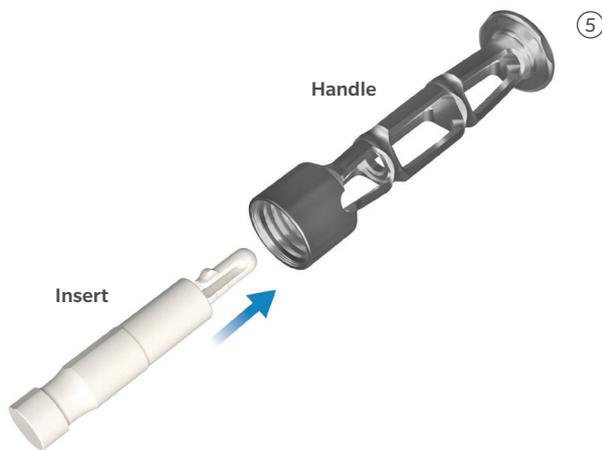
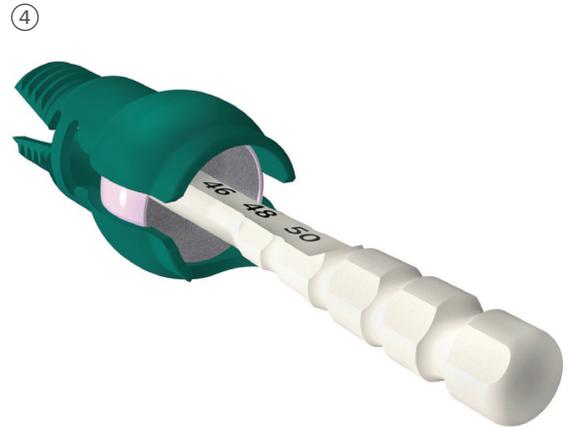
## Head Impaction

### Head Loading (Cont.)

4. Check that the rim of the H1 Head is making contact with the Head Impaction Cap all the way round.
5. Insert the Head Impactor Insert into the Head Impactor Handle until it clicks into place.
6. Tighten the Head Impactor onto the Cap
7. Remove the Head Loader.

**Note:** The Head Impactor Handle must never be used without the Head Impactor Insert.

The Head Impaction Cap must be used together with the Head Impactor to ensure correct impact direction for first impacts.



## Head Impaction

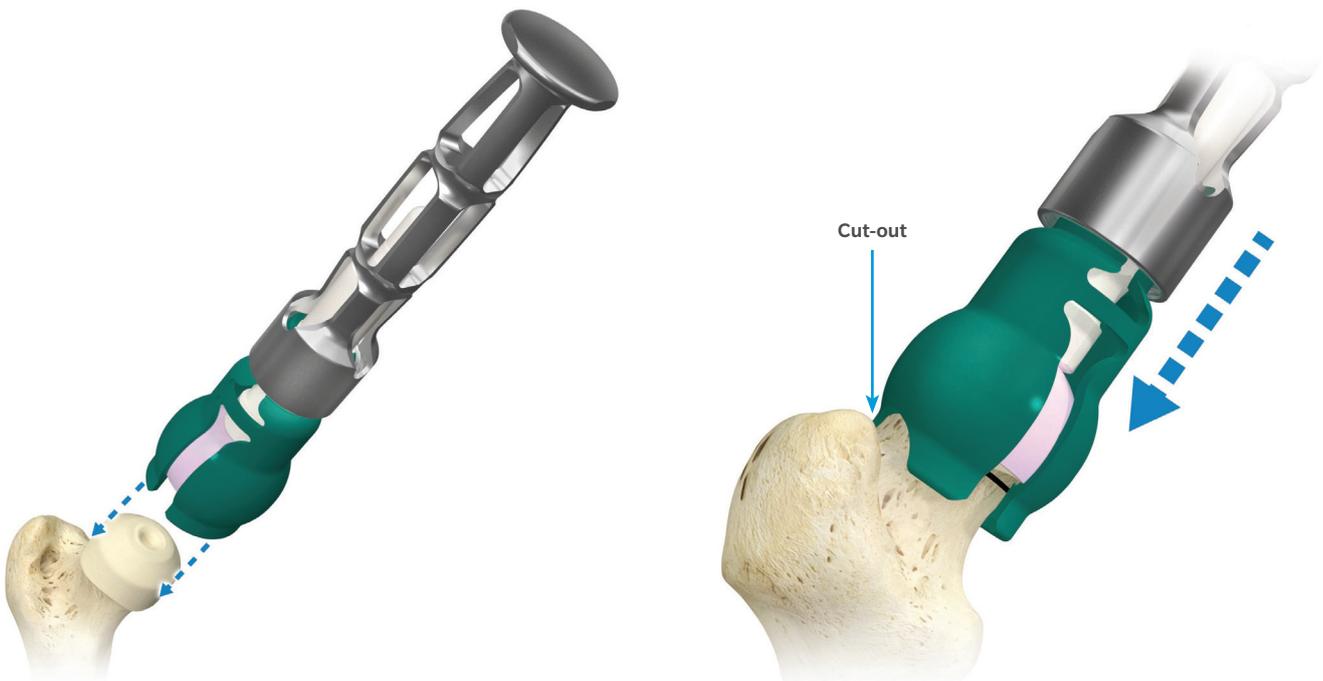
### First Impactions

Offer up the Head Impaction Cap onto the femoral head, ensuring that the shaft of the Head Impactor is parallel with the cylinder cut.

Make sure the cut-out is aligned with highest point of the superior neck (e.g. a cam where present).

Start to gently impact the Head Impactor with a mallet and observe the H1 Head move towards the marked line; stop impacting before the Head Impaction Cap makes bony contact superiorly.

ⓘ **Note:** The superior cut-out on the Head Impaction Cap must be placed superiorly to avoid impingement with short femoral necks.



## Head Impaction

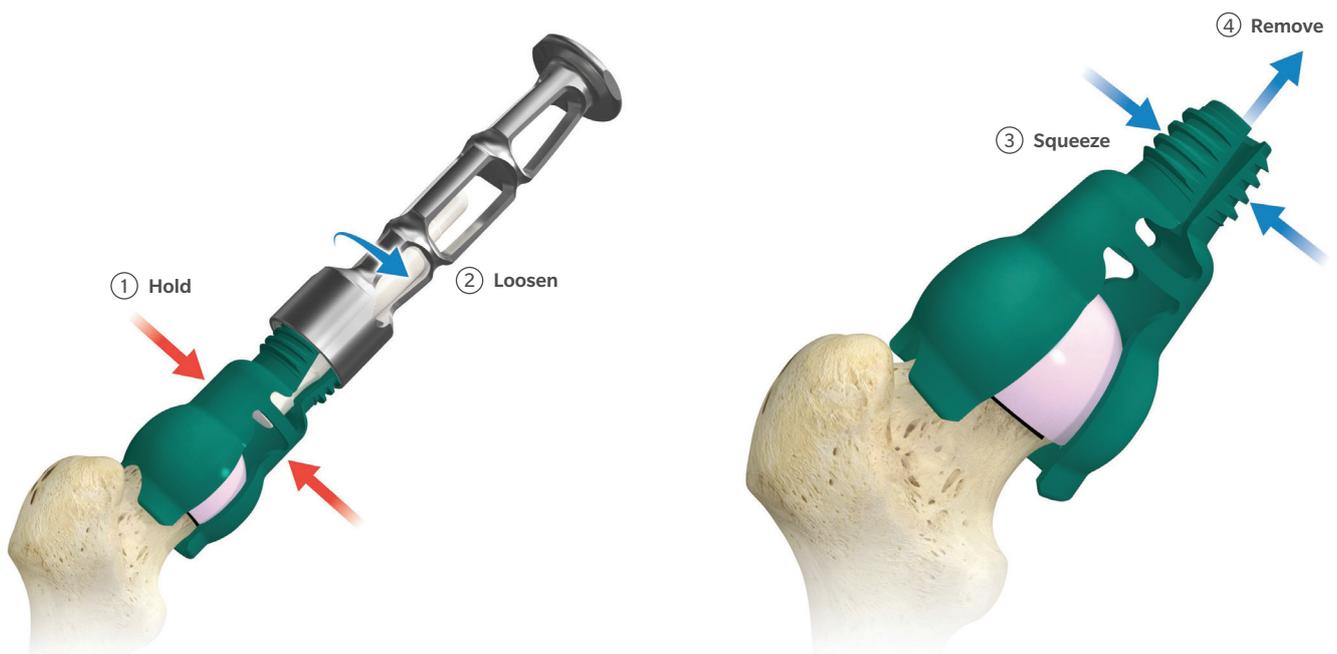
### Superior Neck Check

Towards the end of impaction, before the Head Impaction Cap makes contact with the femoral neck, hold onto the Head Impaction Cap ① and unscrew the Head Impactor ②. Then squeeze the Head Impaction Cap ③ and remove it from the H1 Head ④.

The Head Impaction Cap aids correct alignment of the H1 Head as it is being impacted, so it is important to use it for as long as possible. However, in those patients with shorter femoral necks, it may need removing earlier to avoid contact with the bone.

**Note:** Do not twist the Head Impactor without holding onto the Head Impaction Cap.

Do not remove the Head Impaction Cap too early.



## Head Impaction

### Final Impaction

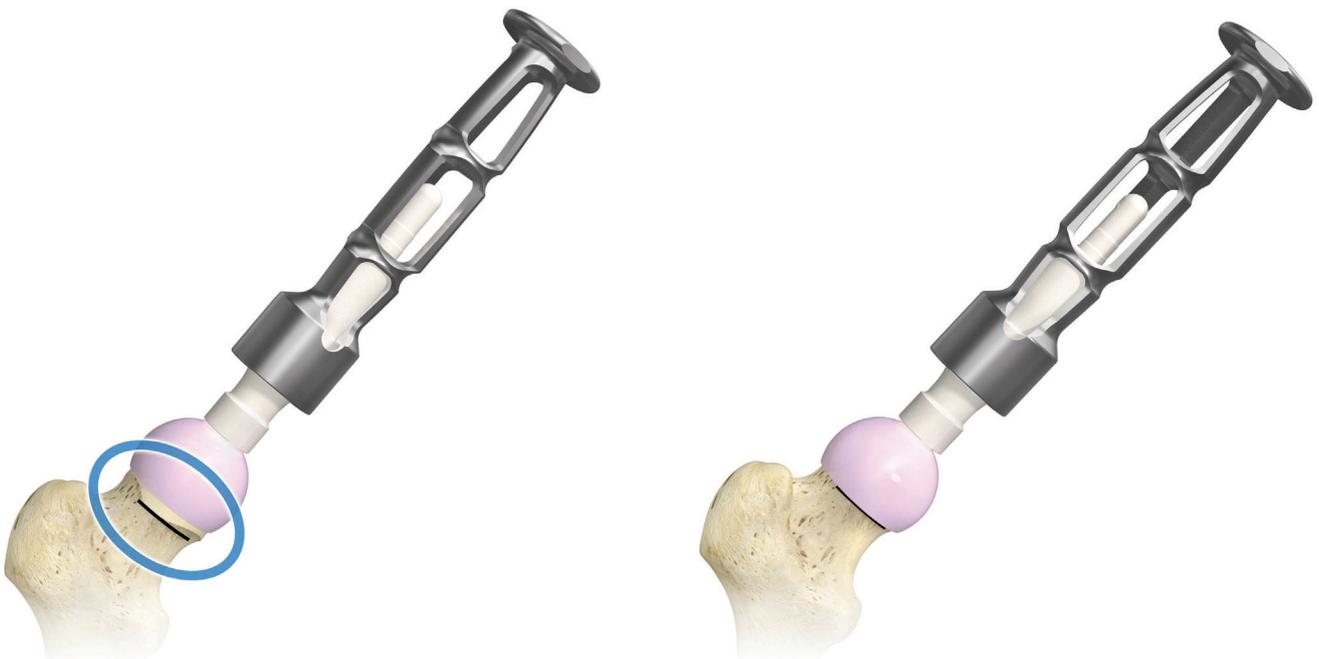
Complete the impaction with the Head Impactor alone. The H1 Head will be fully down when the pitch of the sound heard at impaction changes.

Check that the rim of the H1 Head has reached the previously drawn mark, indicating full seating. Re-impact with the Head Impactor if needed.

ⓘ **Note:** Do not stop impacting until seating is detected.

Do not carry on impacting once seating is detected.

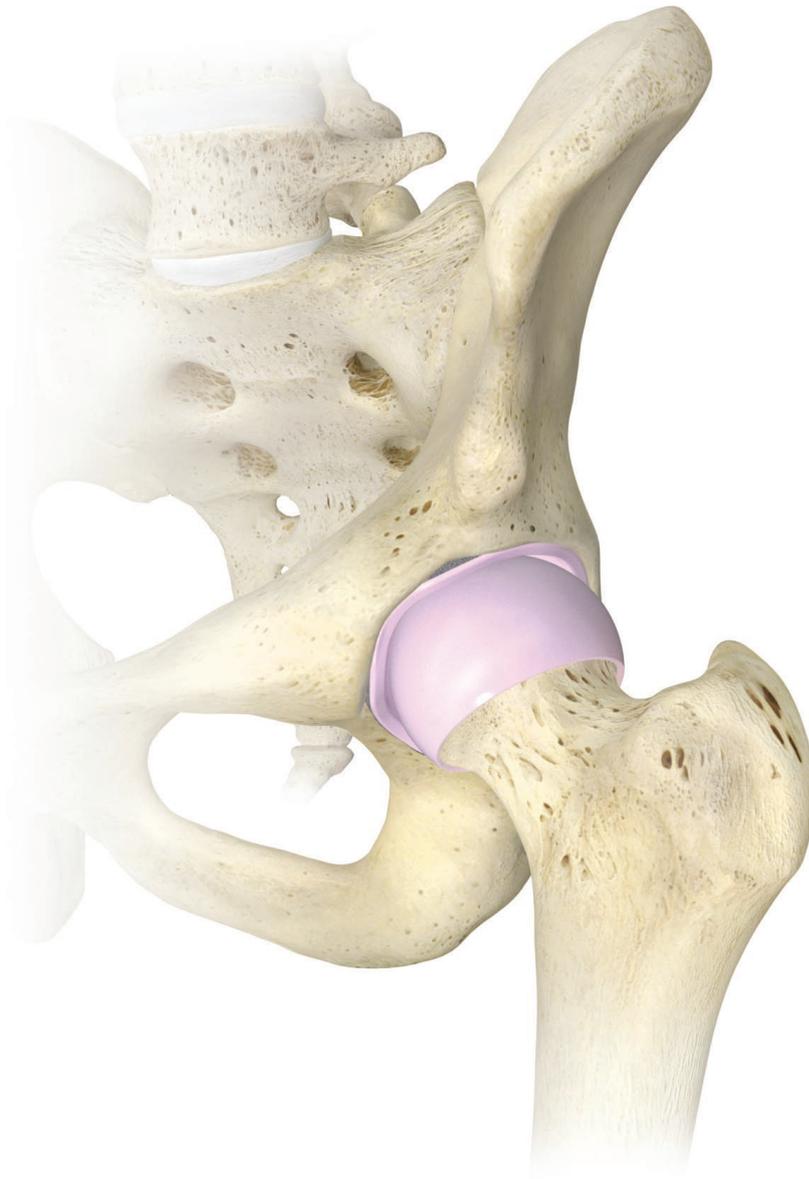
The Head Impactor Handle must never be used without the Head Impactor Insert.



## Final Checks

### Wash, Reduce, ROM Check

Clean the bearing surfaces and fill the acetabulum with saline. Reduce the joint and check ROM.



## APPENDIX A

### H1 Implant Positioning

The H1 positioning philosophy is based on the work and findings of Michael Freeman [1], Derek McMinn [2], Koen de Smet [3] and the clinical experience of using the H1. Whilst the positioning of the acetabular resurfacing component should be familiar to the hip surgeon, the positioning of the femoral resurfacing component can be challenging owing to the requirement to complement the native anatomy.

The H1 planning process and instruments guide the surgeon into achieving the following 5 key aims for the H1 Head:

- I. The H1 Head should sit centrally on the femoral neck (not necessarily on the native femoral head) and “excess” medial arthritic femoral head bone, which is weak, should be resected. The Head Guide places the Guide Wire so that it is central to its inferior and superior jaws and therefore the neck.
- II. All machined bone should be covered by the H1 Head, especially at the medial and lateral head neck junctions. The H1 Head should overlap the medial and lateral cortices to ensure that the weaker machined trabecular bone is not overstressed. The Sleeve Ring allows the coverage of the head neck junction to be directly visualised after the bone has been machined.
- III. The H1 Head must be positioned in valgus compared to the native neck anatomy to ensure correct load transfer to the native neck. Most importantly, the H1 Head should never be placed in varus as this may result in post-operative fracture. The optimal angle is individual to the patient and highly dependent on femoral bone morphology. Patient specific measurements determined during planning are dialled into the Head Guide in order to achieve this optimal stem-shaft angle. The Head Guide also limits the Guide Wire insertion angle so that varus positioning is prevented.

## APPENDIX A

### H1 Implant Positioning (Cont.)

- IV. Superior notching is a risk when aiming for a large amount of valgus. During planning, the chosen H1 Head position should be positioned so that the Sleeve Cutter does not notch the superior cortex, as this may result in post-operative fracture. The H1 Instruments include a Stylus which must be used intra-operatively to check the notching risk at the Guide Wire stage.
- V. The H1 Head must be adequately supported by the underlying bone. Due to the centralisation of the H1 Head on the femoral neck, there is a risk that adequate implant-bone contact is not achieved at the superolateral portion of the head, particularly in femoral morphologies such as ‘pistol grip’, and in well-worn femoral heads. The Stylus should be used intra-operatively to check the bone “stock” in this position at the Guide Wire stage.

In summary, the H1 Head must be positioned:

- Centrally to the femoral neck;
- In enough valgus;
- Without notching;
- With the implant covering all areas of machined bone; and
- With enough lateral bone stock.

Implant size, orientation and positioning along the stem axis are all variables which will be altered to achieve these multiple aims. In addition, attention must be paid to post-operative leg-length and the chosen H1 Head and, therefore, H1 Cup size must align with the acetabulum.



## APPENDIX B

### Pre-Operative Planning

The following planning process shall be used to achieve the positioning aims stated in Appendix A.

Planning should be carried out on a calibrated AP pelvis radiograph, using the Embody H1 templates. Calibration should be used, but please note that radiographs will always contain a certain amount of magnification error. The measurements that are taken from the radiograph to be input into the Head Guide should be verified intra-operatively and adjusted as required.

Keep in mind that osteophytes can obstruct the Head Guide placement intra-operatively.

The H1 planning process has extra steps associated with templating the use of the Head Guide compared to other hip resurfacing systems. Follow these 4 steps to plan the H1 Head in the digital templating software:

#### 1. Head Template

- a. Import an H1 Head template size based on the width of the neck.
- b. Align the template's shaft lines to be parallel to the femoral shaft: the H1 Head will now be at a 140° stem-shaft angle.
- c. Observe the angle between the stem of the implant and the native neck. If this is not clearly in valgus, increase the angle until it is.

#### 2. Adjustments

Whilst ensuring the H1 Head remains centred on the femoral neck, adjust the angle, size and position of the H1 Head if necessary to ensure that (in order of priority):

- a. There is no notching.
- b. The implant overlaps cortex at both the medial and lateral head neck junctions.
- c. The stem axis remains in valgus compared to the native neck axis. In the majority of cases, the H1 Head will be at an angle of approximately 140° to the shaft, however in some coxa vara cases that will not be achievable, and in some coxa valga cases, that may not be sufficient.
- d. The implant is adequately supported (lateral bone stock is sufficient).
- e. The medial rim is positioned at the medial head neck junction.
- f. The leg isn't shortened.

## APPENDIX B

### Pre-Operative Planning (Cont.)

#### 3. Cup Template

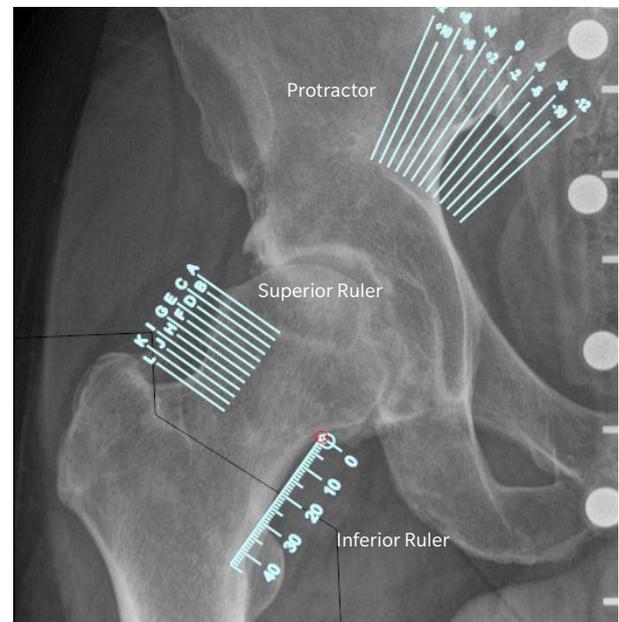
- Import the matching H1 Cup template (this will be labelled 7mm larger than the chosen H1 Head).
- Position the H1 Cup at the preferred inclination and translate to avoid overhang, observing the proximity of the cup to the medial wall. Be aware that the H1 Cup is contoured to avoid implant overhang, particularly anterosuperiorly at the position where the psoas tendon moves over the acetabular rim, but this is not shown on the template.
- Ensure that the size is acceptable. If it is not, return to stage 2 and adjust the head template size.

#### 4. Neck Template

- Import the neck template
- Align the neck template onto the femoral neck by placing the circle representing the upper inferior jaw onto a point on the medial femoral neck towards the head neck junction.
- Rotate the neck template until the inferior ruler crosses the neck at a lower point on the medial femoral neck, clear of the lesser trochanter. This crossing point represents where the lower inferior jaw will be.
- Adjust the location of the inferior ruler to ensure that the locations of the upper and lower inferior jaws are well spaced for stability and locate onto accessible parts of the medial neck.

- Record the Number on the ruler at the lower inferior jaw point.
- Record the Letter line on the superior ruler which crosses the femoral neck at the narrowest section of the neck.
- Note the increment on the protractor to which the tramlines of the head template are parallel. Record the Angle.

Ultimately, the compromises which are required are heavily dependent on bone morphology. Some femoral morphology will require minimal compromise, except possible downsizing to align the H1 Head with the medial cortex and to centre it on the neck. Cam morphologies, which often have short necks, low head neck ratios and coxa vara, require many more compromises.



## APPENDIX C

### Femur First or Acetabulum First

Surgeons may choose to perform the H1 Hip Resurfacing using either a 'femur first' or a 'acetabulum first' technique.

The femur first technique is routine in cam and dysplastic cases and reduces the size of the head before acetabular preparation, improving visualisation of the socket.

The acetabulum first technique may require more soft tissue dissection for adequate access but may be preferred in profunda cases where minimising the size of the acetabular component is critical.

The broad differences in the technique order are shown in the flow charts below:

#### Femur First



#### Acetabular First



## APPENDIX D

### The Head Guide

Three parameters should be exported from the templates used during planning and input into the Head Guide:

Templates	Parameter	Head Guide
Inferior Ruler	→ <b>Number</b>	→ Upper and lower inferior jaws
Superior Ruler	→ <b>Letter</b>	→ Superior jaw
Protractor	→ <b>Angle</b>	→ Varus/Valgus Dial

#### Number

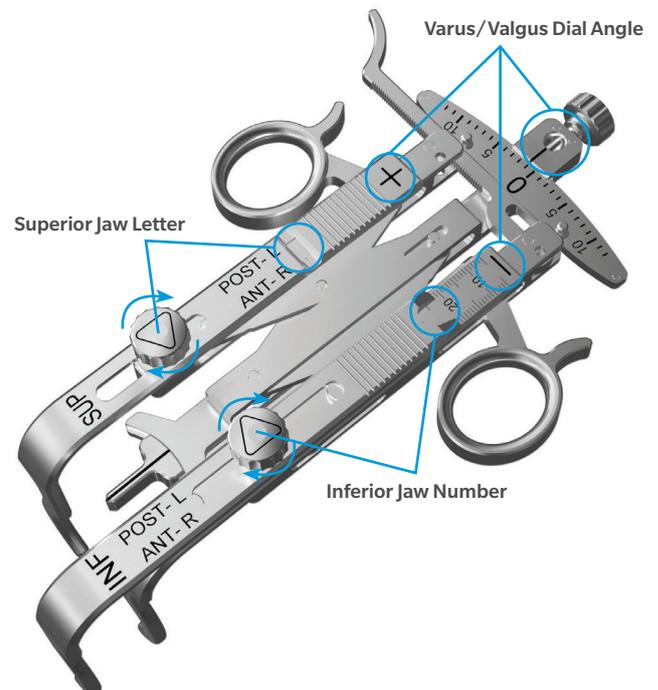
The Number represents the distance between the inferior jaws of the Head Guide. These should be spaced so that the Head Guide is stable and can locate in only one position. The Number determined during the planning is just a guide. If required, the jaw spacing can be altered intra-operatively to correct any magnification error and to ensure that the jaw locations planned pre-operatively are being replicated intra-operatively. The line connecting these jaws forms the datum for the Angle.

#### Letter

The Letter represents the location of the single superior jaw of the Head Guide. This jaw stabilises the guide and positions the Guide Wire centrally within the neck, when the inferior jaws are also in contact with bone. The Letter varies significantly with different bone morphologies.

#### Angle

The Angle represents the angle between the H1 Head stem (and therefore the Guide Wire) and the inferior jaws of the Head Guide. The planned Angle varies as a result of both the planned implant position and the location of the inferior jaws on the neck.

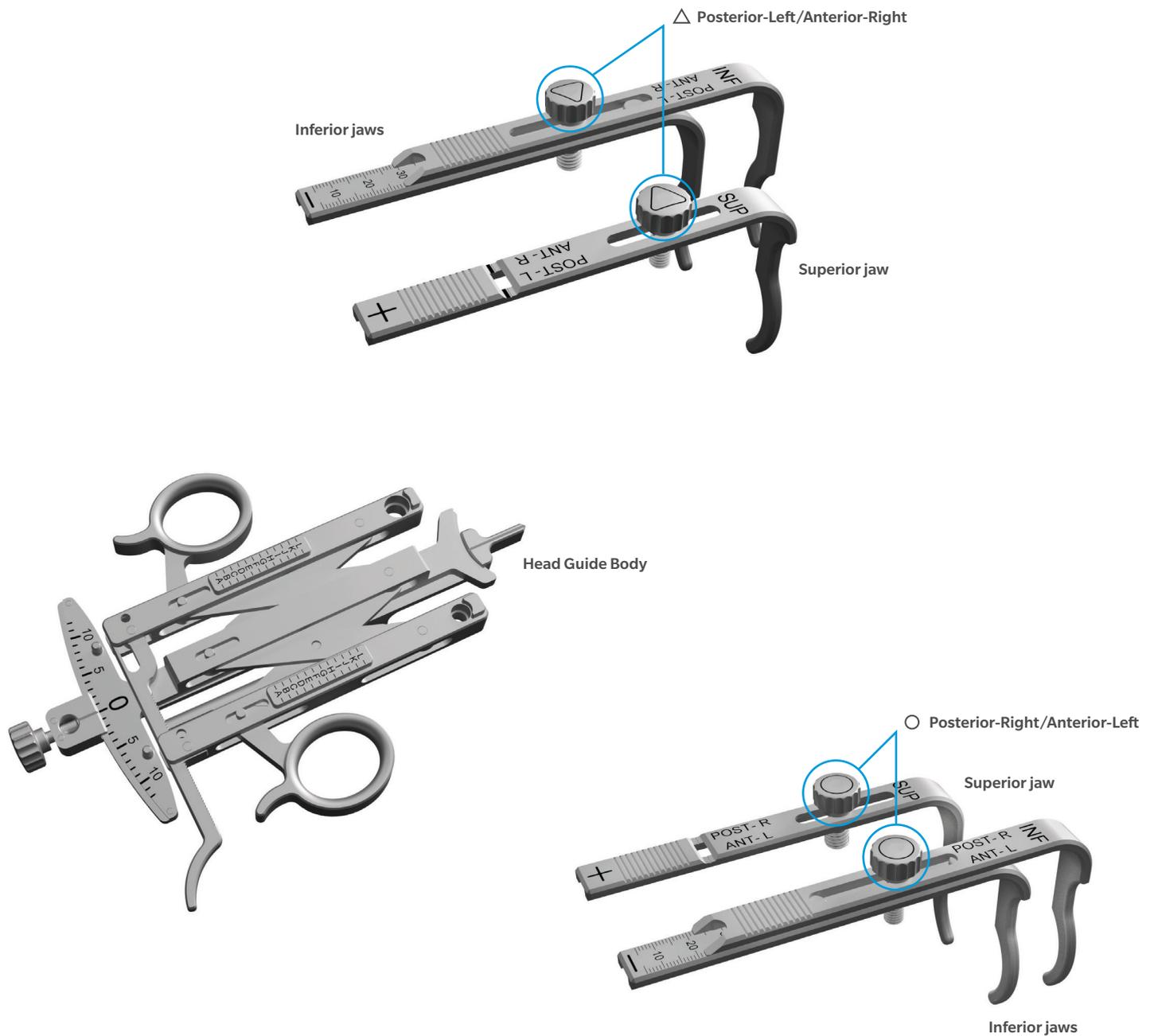


## APPENDIX D

### The Head Guide (Cont.)

There is a single Head Guide Body. There are two sets of Jaws that connect to the Head Guide Body, depending on the view of the femur using the approach of choice and the side of hip that is being operated on.

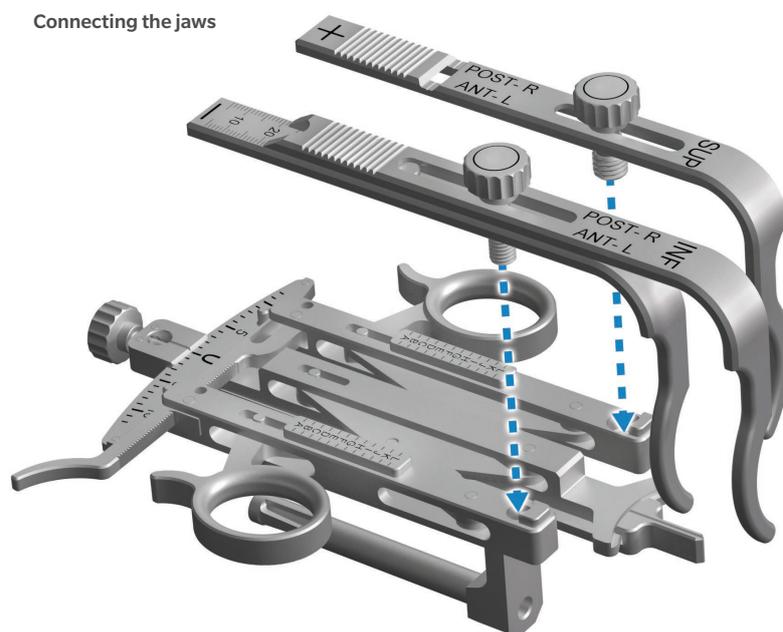
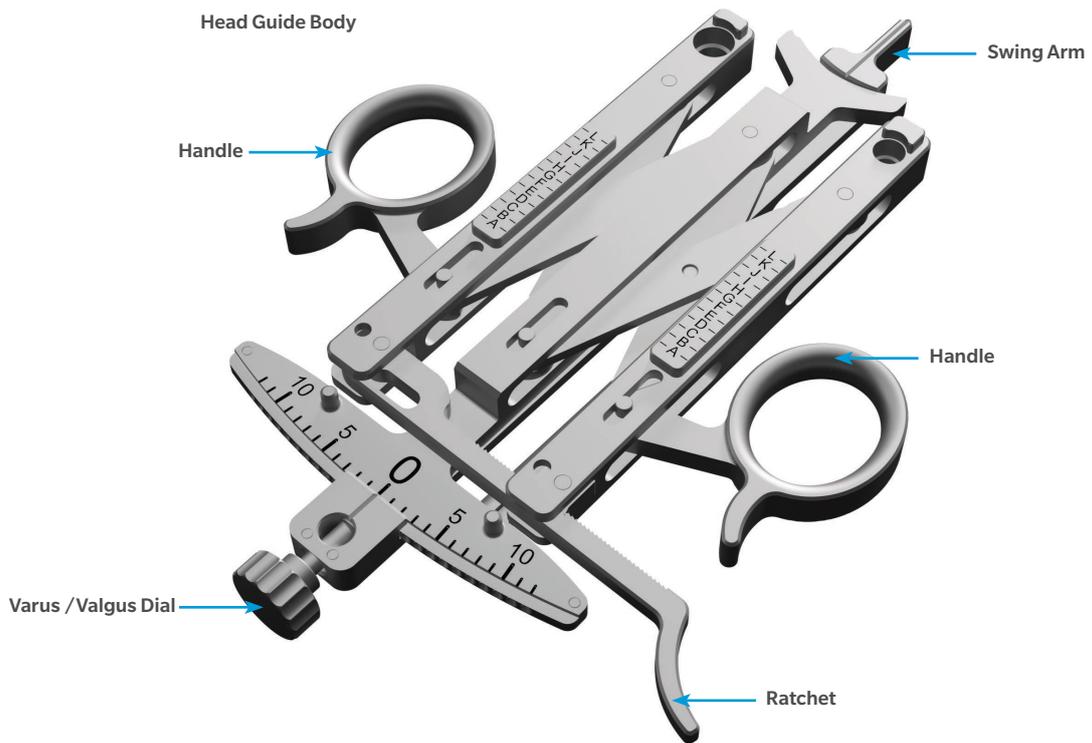
△ and ○ markings are used on the instruments to assist in selecting the correct set of jaws.



## APPENDIX D

### The Head Guide (Cont.)

#### Terminology and Assembly



## APPENDIX E

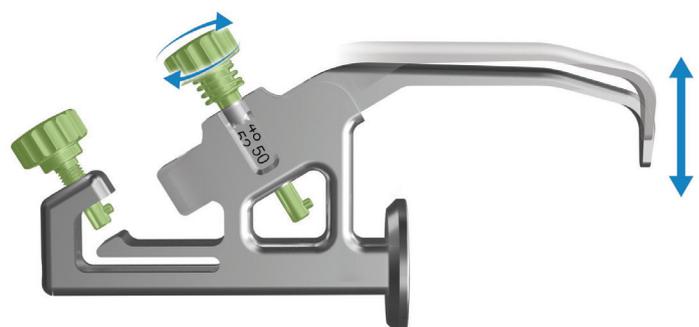
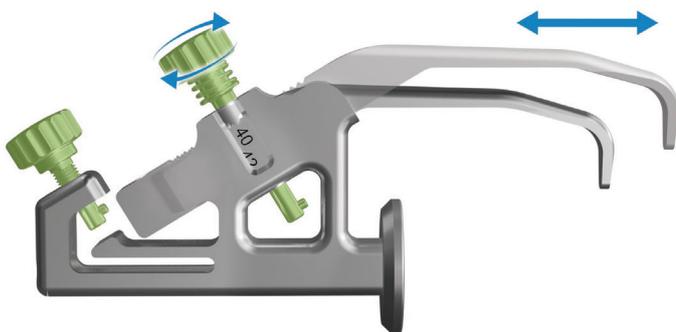
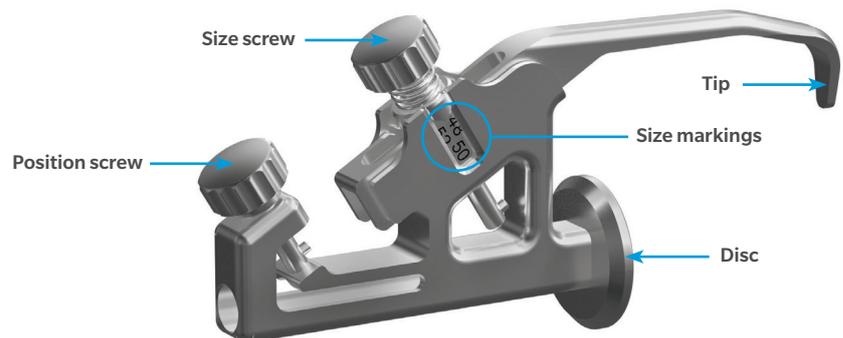
### The Stylus

There is a single Stylus that has 10 size settings corresponding to the H1 Head sizes.

The Stylus should be used on the Head Guide prior to Guide Wire insertion to check for adequate bone stock and then again before Guide Rod drilling to re-check bone stock and set the depth of sleeve cut that will achieve good implant placement without notching.

With the size screw fully unlocked, the correct size can be selected by sliding the tip.

With the size screw partially unlocked, the size setting will remain but the tip can be shifted away from the centre line to allow it to pass over the femoral head.



## APPENDIX F

### The Cup Impactor

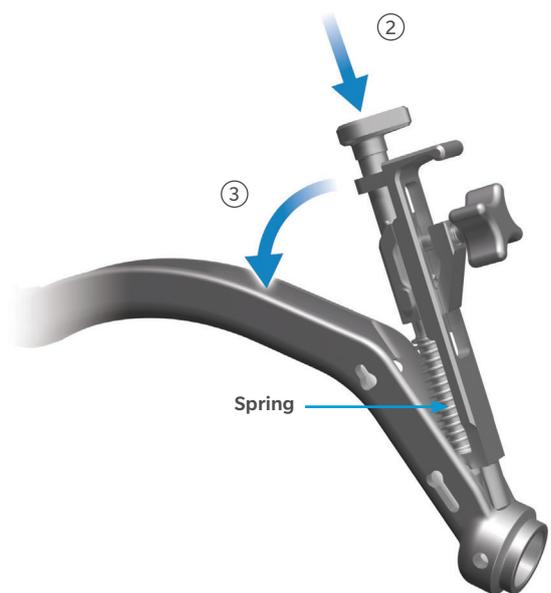
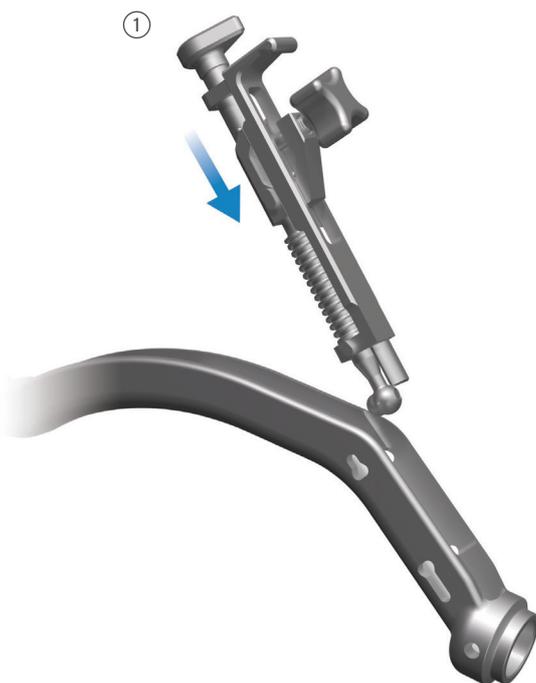
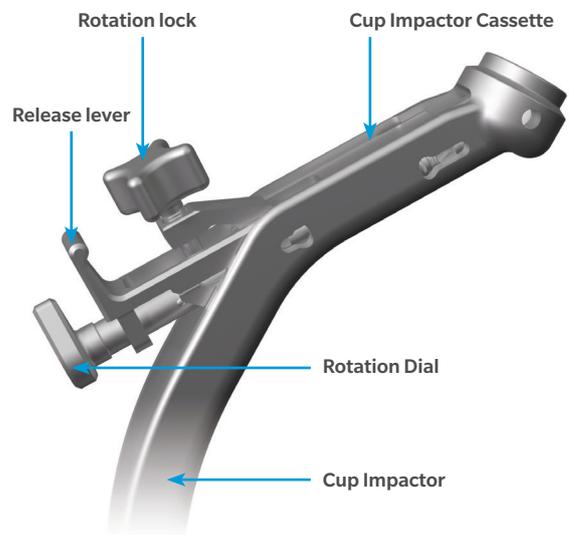
#### Terminology and Assembly

The Cup Impactor has two components which connect together:

1. The main Cup Impactor
2. The Cup Impactor Cassette, which connects to the Cup Trial and the Cup Impaction Cap and allows fine rotational adjustments to be made to the H1 Cup position.

**Load the Cup Impactor Cassette into the Cup Impactor:**

1. Slide it in, engage the front pins of the Cassette in the slots.
2. Press the rotation dial to compress the spring.
3. Lower into position to engage the rear pins in the slots and then release.



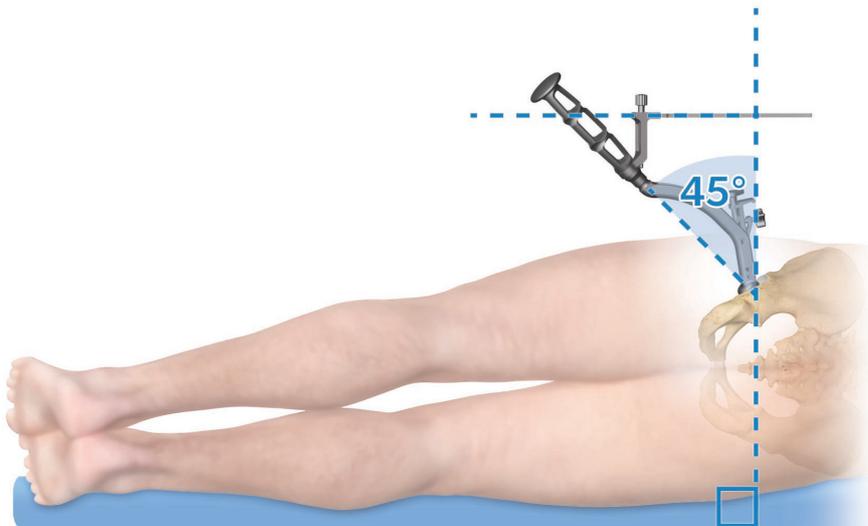
## APPENDIX G

### The Aerials

#### Patient in the Lateral Position

For patients in the lateral position, to achieve 45° cup inclination and 20° cup anteversion, ensure that the arms of the Lateral Aerial are parallel to the floor and the anterior arm is parallel to the longitudinal axis of the body:

Posterior view of cup inclination indicated by the Lateral Aerial



Lateral view of cup anteversion indicated by the Lateral Aerial



**Note:** Make sure the correct Aerial is used according to the patient's position.

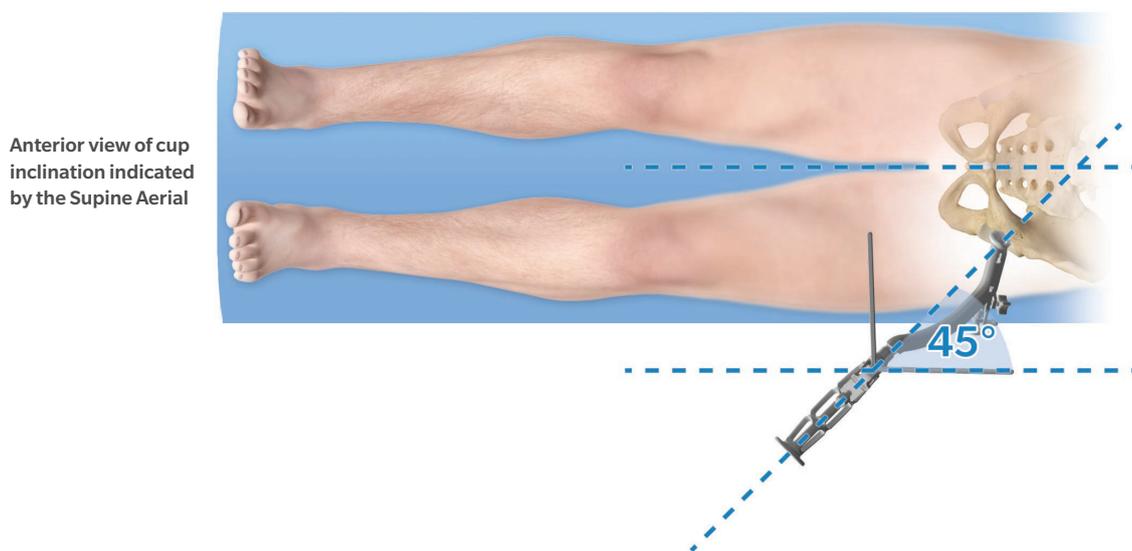
The Aerial must be used for inclination and anteversion guidance.

## APPENDIX G

### The Aerials (Cont.)

#### Patient in the Supine Position

For patients in the supine position, to achieve 45° cup inclination and 20° cup anteversion, ensure that the arms of the Supine Aerial are parallel to the floor and the lateral arm is parallel to the longitudinal axis of the body:



Lateral view of cup anteversion indicated by the Supine Aerial



**Note:** Make sure the correct Aerial is used according to the patient's position.

The Aerial must be used for inclination and anteversion guidance.

## Inventory

### H1 Implant

#### H1 Femoral Heads

Size	REF	UDI-DI
40	19640	05060768010425
42	19642	05060768010432
44	19644	05060768010449
46	19646	05060768010456
48	19648	05060768010463
50	19650	05060768010470
52	19652	05060768010487
54	19654	05060768010494
56	19656	05060768010500
58	19658	05060768010517



#### H1 Acetabular Cups

Size	REF	UDI-DI
47	19847	05060768010326
49	19849	05060768010333
51	19851	05060768010340
53	19853	05060768010357
55	19855	05060768010364
57	19857	05060768010371
59	19859	05060768010388
61	19861	05060768010395
63	19863	05060768010401
65	19865	05060768010418



### H1 X-Ray Templates

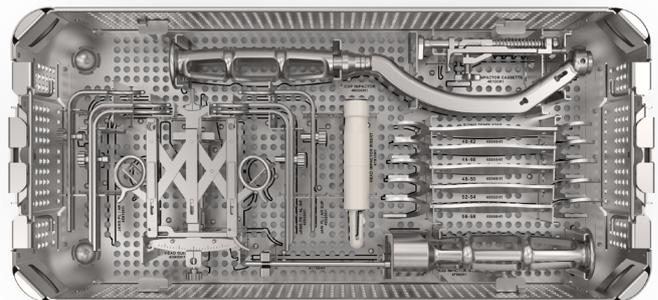
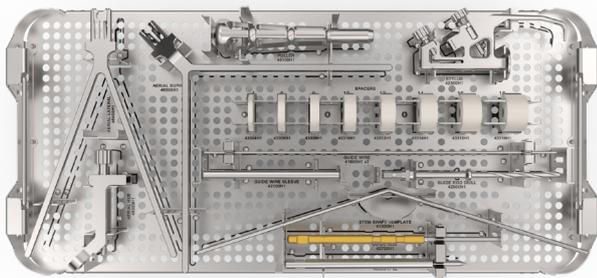
Name	REF
H1 X-Ray Template set, Scale 100%	49010H1
H1 X-Ray Template set, Scale 115%	49020H1
H1 X-Ray Template set, Scale 120%	49030H1

## Inventory

### H1 Instruments

#### Tray 1

Name	REF	Name	REF
H1 Sizing Template 40-42	40540H1	H1 Spacer 8	43308H1
H1 Sizing Template 44-46	40544H1	H1 Spacer 10	43310H1
H1 Sizing Template 48-50	40548H1	H1 Spacer 12	43312H1
H1 Sizing Template 52-54	40552H1	H1 Spacer 14	43314H1
H1 Sizing Template 56-58	40556H1	H1 Spacer 16	43316H1
H1 Head Guide Body	40900H1	H1 Spacer 18	43318H1
H1 Head Guide Jaws - P-L / A-R SUP	40920H1	H1 Cup Impactor	46000H1
H1 Head Guide Jaws - P-R / A-L INF	40930H1	H1 Cup Impactor Cassette	46100H1
H1 Head Guide Jaws - P-L / A-R INF	40910H1	H1 Aerial Lateral	46400H1
H1 Head Guide Jaws - P-R / A-L SUP	40940H1	H1 Aerial Supine	46500H1
H1 Stem Shaft Template	41300H1	H1 Aerial Hub	46300H1
H1 Spiked Tube	41700H1	H1 Puller	48100H1
H1 Guide Wire	41900H1	H1 Retractor Nail	40300H1
H1 Guide Wire Sleeve	42100H1	H1 Head Impactor Handle	47900H1
H1 Stylus	42300H1	H1 Head Impactor Tip	47910H1
H1 Guide Rod Drill	42500H1	H1 Instruments Tray 1 Insert	50160H1
H1 Guide Rod	42700H1	H1 Instruments Lid	50290H1
H1 Spacer 4	43304H1	H1 Instruments Tray 1 Case	50150H1
H1 Spacer 6	43306H1		



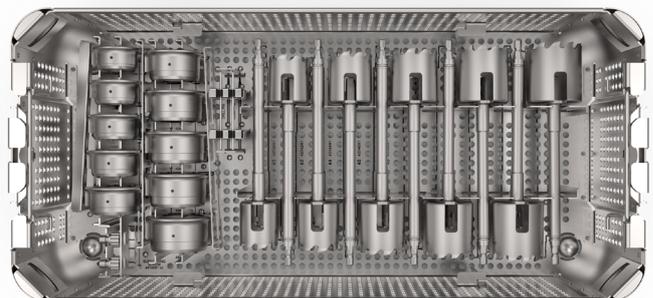
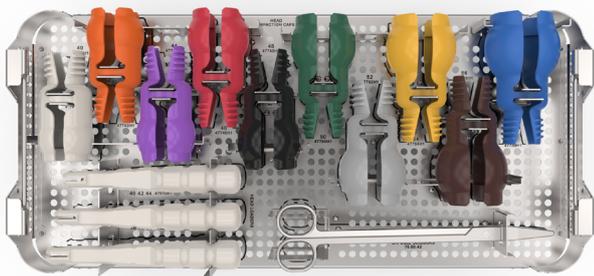
## Inventory

### H1 Instruments

#### Tray 2

Name	REF
H1 Sleeve Cutter 40	43740H1
H1 Sleeve Cutter 42	43742H1
H1 Sleeve Cutter 44	43744H1
H1 Sleeve Cutter 46	43746H1
H1 Sleeve Cutter 48	43748H1
H1 Sleeve Cutter 50	43750H1
H1 Sleeve Cutter 52	43752H1
H1 Sleeve Cutter 54	43754H1
H1 Sleeve Cutter 56	43756H1
H1 Sleeve Cutter 58	43758H1
H1 Sleeve Ring 40	43940H1
H1 Sleeve Ring 42	43942H1
H1 Sleeve Ring 44	43944H1
H1 Sleeve Ring 46	43946H1
H1 Sleeve Ring 48	43948H1
H1 Sleeve Ring 50	43950H1
H1 Sleeve Ring 52	43952H1
H1 Sleeve Ring 54	43954H1
H1 Sleeve Ring 56	43956H1
H1 Sleeve Ring 58	43958H1

Name	REF
H1 Sleeve Ring Screw	44100H1
H1 Drill Pin	48300H1
H1 Head Impaction Cap 40	47740H1
H1 Head Impaction Cap 42	47742H1
H1 Head Impaction Cap 44	47744H1
H1 Head Impaction Cap 46	47746H1
H1 Head Impaction Cap 48	47748H1
H1 Head Impaction Cap 50	47750H1
H1 Head Impaction Cap 52	47752H1
H1 Head Impaction Cap 54	47754H1
H1 Head Impaction Cap 56	47756H1
H1 Head Impaction Cap 58	47758H1
H1 Head Loader 40-44	47510H1
H1 Head Loader 46-50	47520H1
H1 Head Loader 52-58	47530H1
Capsule Scissors	75.00.42
H1 Instruments Tray 2 Case	50210H1
H1 Instruments Tray 2 Insert	50220H1
H1 Instruments Lid	50290H1



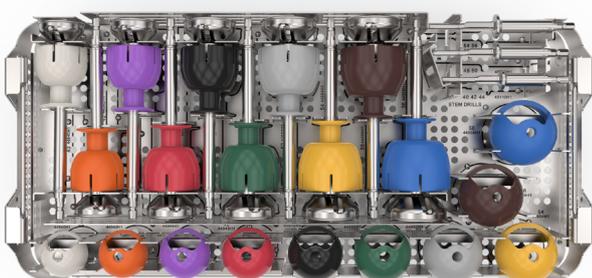
## Inventory

### H1 Instruments

#### Tray 3

Name	REF
H1 Cup Trial 47	46747H1
H1 Cup Trial 49	46749H1
H1 Cup Trial 51	46751H1
H1 Cup Trial 53	46753H1
H1 Cup Trial 55	46755H1
H1 Cup Trial 57	46757H1
H1 Cup Trial 59	46759H1
H1 Cup Trial 61	46761H1
H1 Cup Trial 63	46763H1
H1 Cup Trial 65	46765H1
H1 Cup Impaction Cap Body 47	46947H1
H1 Cup Impaction Cap Body 49	46949H1
H1 Cup Impaction Cap Body 51	46951H1
H1 Cup Impaction Cap Body 53	46953H1
H1 Cup Impaction Cap Body 55	46955H1
H1 Cup Impaction Cap Body 57	46957H1
H1 Cup Impaction Cap Body 59	46959H1
H1 Cup Impaction Cap Body 61	46961H1
H1 Cup Impaction Cap Body 63	46963H1
H1 Cup Impaction Cap Body 65	46965H1
H1 Cup Impaction Cap Seal 47	47147H1
H1 Cup Impaction Cap Seal 49	47149H1
H1 Cup Impaction Cap Seal 51	47151H1
H1 Cup Impaction Cap Seal 53	47153H1
H1 Cup Impaction Cap Seal 55	47155H1
H1 Cup Impaction Cap Seal 57	47157H1
H1 Cup Impaction Cap Seal 59	47159H1
H1 Cup Impaction Cap Seal 61	47161H1
H1 Cup Impaction Cap Seal 63	47163H1
H1 Cup Impaction Cap Seal 65	47165H1
H1 Rim Impactor	47300H1
H1 Chamfer Cutter 40	50290H1
H1 Chamfer Cutter 42	50280H1
H1 Chamfer Cutter 44	50270H1

Name	REF
H1 Chamfer Cutter 46	44540H1
H1 Chamfer Cutter 48	44542H1
H1 Chamfer Cutter 50	44544H1
H1 Chamfer Cutter 52	44546H1
H1 Chamfer Cutter 54	44548H1
H1 Chamfer Cutter 56	44550H1
H1 Chamfer Cutter 58	44552H1
H1 Chamfer Cutter Cap 40	44554H1
H1 Chamfer Cutter Cap 42	44556H1
H1 Chamfer Cutter Cap 44	44558H1
H1 Chamfer Cutter Cap 46	44740H1
H1 Chamfer Cutter Cap 48	44742H1
H1 Chamfer Cutter Cap 50	44744H1
H1 Chamfer Cutter Cap 52	44746H1
H1 Chamfer Cutter Cap 54	44748H1
H1 Chamfer Cutter Cap 56	44750H1
H1 Chamfer Cutter Cap 58	44752H1
H1 Stem Drill 40-44	44754H1
H1 Stem Drill 46-50	44756H1
H1 Stem Drill 52-58	44758H1
H1 Head Trial 40	45110H1
H1 Head Trial 42	45120H1
H1 Head Trial 44	45130H1
H1 Head Trial 46	44940H1
H1 Head Trial 48	44942H1
H1 Head Trial 50	44944H1
H1 Head Trial 52	44946H1
H1 Head Trial 54	44948H1
H1 Head Trial 56	44950H1
H1 Head Trial 58	44952H1
H1 Instruments Lid	44954H1
H1 Instruments Tray 3 Insert	44956H1
H1 Instruments Tray 3 Case	44958H1





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9 Lydden Road  
London SW18 4LT  
United Kingdom  
[www.embody-ortho.com](http://www.embody-ortho.com)

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