Surgical Technique

smith&nephew

EMPERION®

Modular Hip System

Introduction

The EMPERION® Modular Hip System is a versatile system that can be used for primary and revision hip surgeries. Using modular proximal bodies, this system addresses the proximal and distal mismatch of different femoral anatomies and provides infinite version control for maximum stability.

Combining proven design with innovative technology, the EMPERION Modular Hip System is a simpler, more versatile hip system that delivers enhanced performance.

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EMPERION◇ Modular Hip System Surgical Technique

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Contents

Nota Bene The technique description herein is made available to the healthcare professional to illustrate the authors' suggested treatment for the uncomplicated procedure. In the final analysis, the preferred treatment is that which addresses the needs of the patient.

EMPERION◇ System Specifications

Stems

- Made from Titanium alloy (Ti-6Al-4V)
- Primary, standard revision and long revision (bowed) sizes
- Neck shaft angle at 131°
- Circulotrapezoidal neck for increased range of motion
- Primary in standard and high offset
- 15° neck anteversion on bowed stem
- Standard, +10 and +20 calcar neck revision options
- Distal stem fluted, slotted, with a polished bullet tip
- 10mm–12mm of bow offset

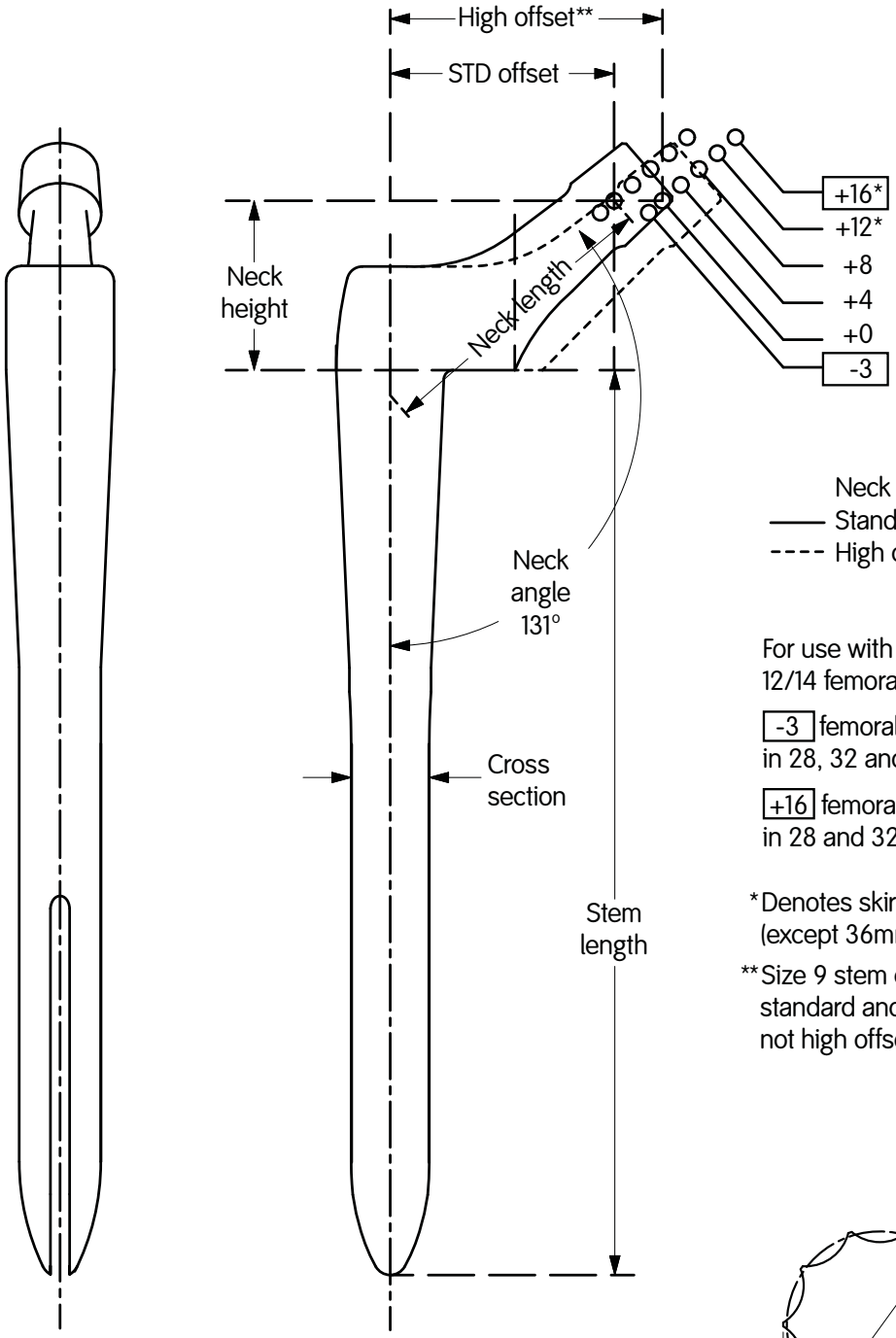
Primary stem options

Distal diameter (mm)	Length (mm)	Neck height (mm)	Offset options		
			Reduced offset (mm)	Standard offset (mm)	High offset (mm)
9	140	26	30	34	-
11	140	26	-	34	40
13	150	28	-	37	45
15	150	28	-	37	45
17	160	30	-	40	50
19	160	30	-	40	50

Revision stem options

Distal diameter (mm)	Length (mm)	Offset (mm)	Neck height options		
			Standard neck height (mm)	+10 Calcar neck height (mm)	+20 Calcar neck height (mm)
Standard revision					
11	180	40	26	36	-
13	190	45	28	38	-
15	190	45	28	38	-
17	200	50	30	40	-
19	200	50	30	40	-
21	200	50	30	40	-
23	200	50	30	40	-
Long revision					
11	240	40	26	36	46
13	250	45	28	38	48
15	250	45	28	38	48
17	260	50	30	40	50
19	260	50	30	40	50
21	260	50	30	40	50
23	260	50	30	40	50

EMPERION◇ Primary Stem Specifications



Neck length
Standard offset
High offset

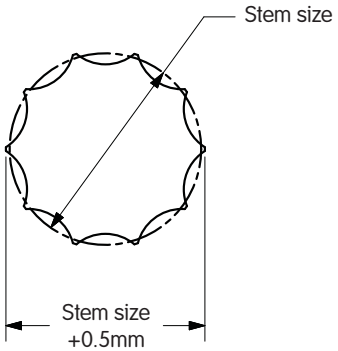
For use with Smith & Nephew 12/14 femoral heads only.

-3 femoral heads available in 28, 32 and 36mm only.

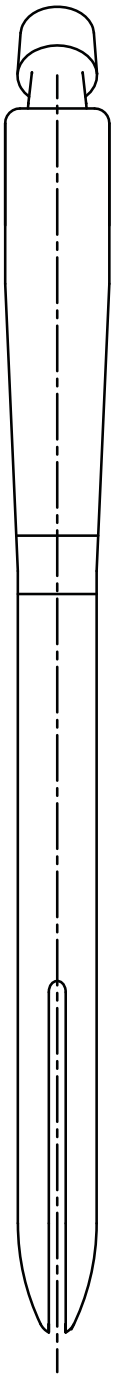
+16 femoral heads available in 28 and 32mm only.

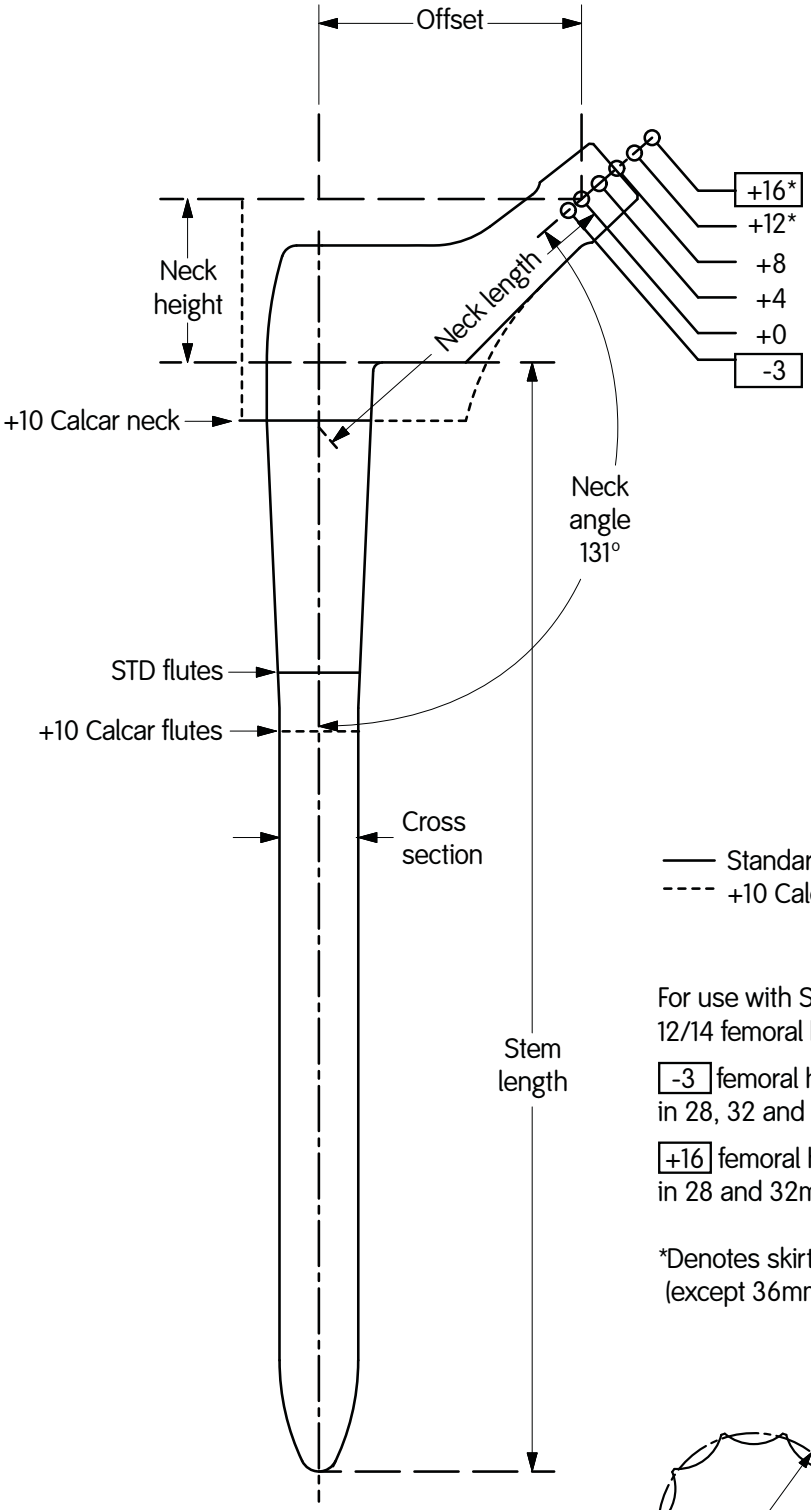
*Denotes skirted heads (except 36mm)

**Size 9 stem comes in standard and reduced offset, not high offset



EMPERION◇ Standard Revision Stem Specifications





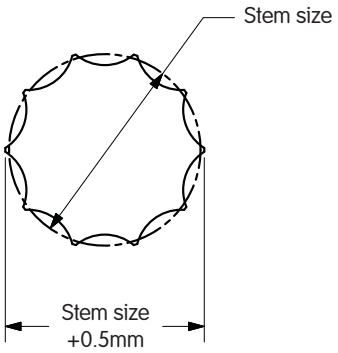
Standard
+10 Calcar

For use with Smith & Nephew 12/14 femoral heads only.

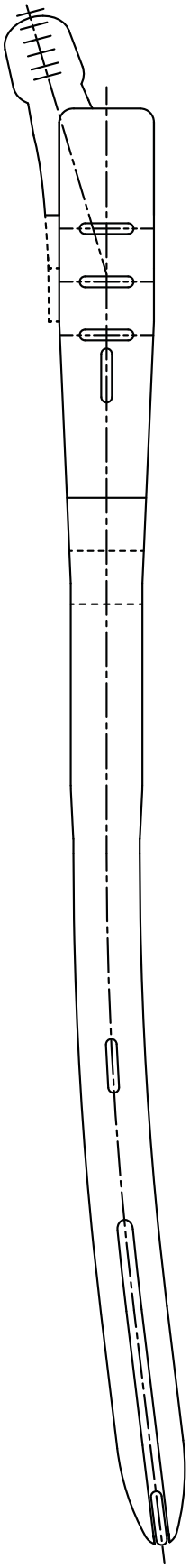
-3 femoral heads available in 28, 32 and 36mm only.

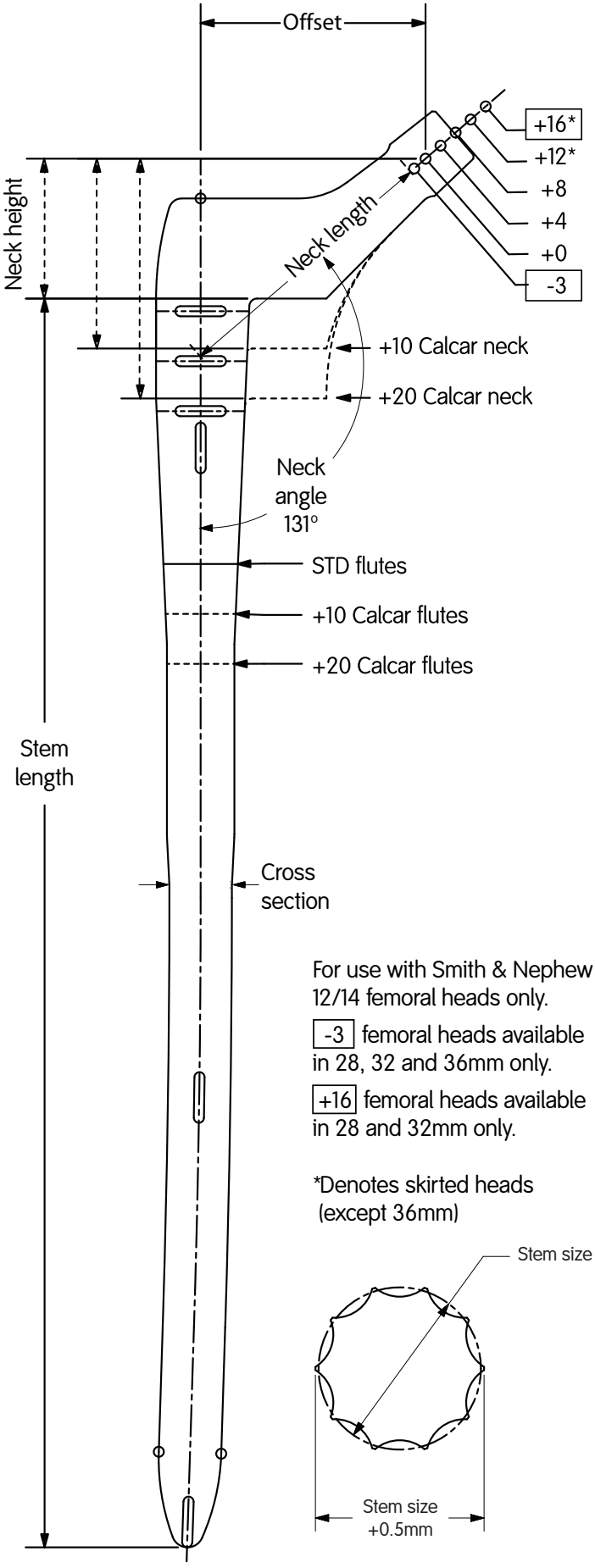
+16 femoral heads available in 28 and 32mm only.

*Denotes skirted heads (except 36mm)



EMPERION◇ Long Revision Stem (Bowed) Specifications





For use with Smith & Nephew 12/14 femoral heads only.

-3 femoral heads available in 28, 32 and 36mm only.

+16 femoral heads available in 28 and 32mm only.

*Denotes skirted heads (except 36mm)

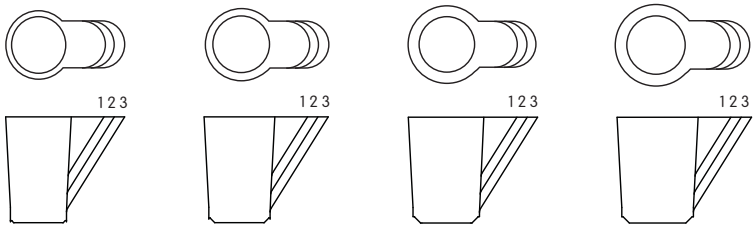
EMPERION◇ Sleeve Specifications

Sleeves

- Titanium alloy (Ti-6Al-4V) with HA on porous coating on all sleeves
- Standard 40mm sleeve length
  - Four cone sizes: S, M, L, and XL (available for stem sizes 17–23)
  - Three spout sizes: 1, 2 and 3
- Tall 60mm sleeve length (available for stem sizes 11–23)
  - Two cone sizes: S and M
  - Two spout sizes: 1 and 2
- The proximal sleeve geometry is the same for standard and tall sleeves. The only variable is the sleeve height.

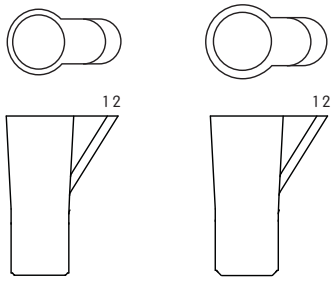
Sleeve options

Standard



Small Medium Large X-large

Tall

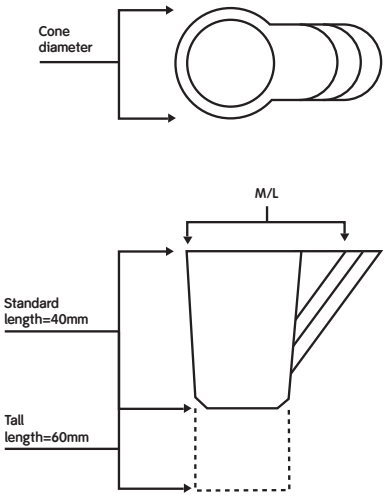


Small Medium

Stem size (mm)	Sleeve length	Cone options	Spout options
9	Standard	S, M, L	1, 2, 3
11	Standard	S, M, L	1, 2, 3
	Tall	S, M	1, 2
13	Standard	S, M, L	1, 2, 3
	Tall	S, M	1, 2
15	Standard	S, M, L	1, 2, 3
	Tall	S, M	1, 2
17	Standard	S, M, L, XL	1, 2, 3
	Tall	S, M	1, 2
19	Standard	S, M, L, XL	1, 2, 3
	Tall	S, M	1, 2
21	Standard	S, M, L, XL	1, 2, 3
	Tall	S, M	1, 2
23	Standard	S, M, L, XL	1, 2, 3
	Tall	S, M	1, 2

Standard sleeve dimensions

Size (mm)	Small cone diameter (mm)	M/L width including spout (mm)		
		Spout 1	Spout 2	Spout 3
9	17	26	30	34
11	19	29	33	37
13	21	32	36	40
15	23	35	39	43
17	25	38	42	46
19	27	41	45	49
21	29	43	47	51
23	31	45	49	53



Size (mm)	Medium cone diameter (mm)	M/L width including spout (mm)		
		Spout 1	Spout 2	Spout 3
9	19	28	32	36
11	21	31	35	39
13	23	34	38	42
15	25	37	41	45
17	27	40	44	48
19	29	43	47	51
21	31	45	49	53
23	33	47	51	55

Size (mm)	Large cone diameter (mm)	M/L width including spout (mm)		
		Spout 1	Spout 2	Spout 3
9	21	30	34	38
11	23	33	37	41
13	25	36	40	44
15	27	39	43	47
17	29	42	46	50
19	31	45	49	53
21	33	47	51	55
23	35	49	53	57

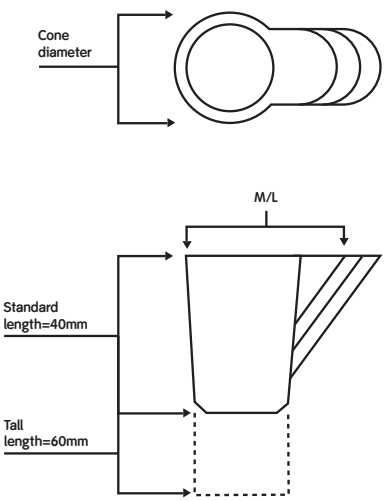
Size (mm)	X-large cone diameter (mm)	M/L width including spout (mm)		
		Spout 1	Spout 2	Spout 3
17	31	44	48	52
19	33	47	51	55
21	35	49	53	57
23	37	51	55	59

EMPERION® Sleeve Specifications (continued)

Tall sleeve dimensions

Size	Small cone diameter (mm)	M/L width including spout (mm)	
		Spout 1	Spout 2
11	19	29	33
13	21	32	36
15	23	35	39
17	25	38	42
19	27	41	45
21	29	43	47
23	31	45	49

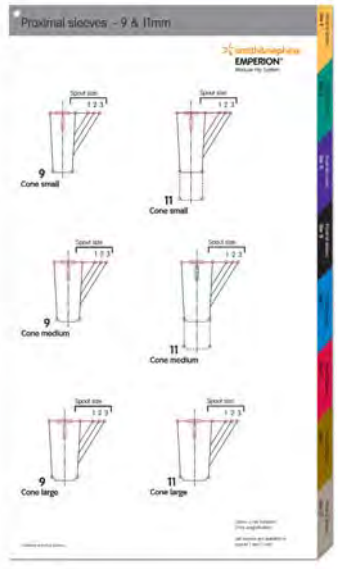
Size	Medium cone diameter (mm)	M/L width including spout (mm)	
		Spout 1	Spout 2
11	21	31	35
13	23	34	38
15	25	37	41
17	27	40	44
19	29	43	47
21	31	45	49
23	33	47	51



EMPERION® System Color-Coding

The EMPERION Modular Hip System uses color-coding to help guide the surgeon and hospital staff through the surgery. Each stem distal diameter is represented by a different color. The color is then used on instrumentation, packaging, templates and tray layouts.

Distal diameter of stem (mm)	Color
9	
11	
13	
15	
17	
19	
21	
23	



Color-coded templates

Color-coded trials

Color-coded trays

Primary Surgery Preoperative Planning

by Bertrand Kaper, MD

The goals of preoperative planning are: (1) accurately determine bone quality, (2) assess limb length and femoral offset and (3) optimize prosthetic sizing and positioning. The anticipated EMPERION° femoral stem and sleeve size, the desired vertical level of the femoral neck osteotomy, and the proper femoral head and stem offset combination can all be determined via a careful analysis of the preoperative radiographs. Thorough preoperative planning will facilitate the performance of the procedure and allow the surgeon to achieve reproducible results.

Preoperative templating requires at least an anteroposterior (A/P) radiograph of the pelvis and a lateral radiograph of the affected hip. The A/P radiograph of the pelvis should be obtained with the hips in approximately 10–15° of internal rotation to account for normal femoral anteversion. Careful positioning of the limb is critical in femoral templating to allow for accurate size and femoral offset measurements. If deformity or pathology is noted in the proximal femur, such as in cases of post-traumatic deformity or previous osteotomy, a full-length A/P radiograph of the femur should also be obtained. Assessment of the opposite hip, if it remains unaffected by disease, can provide helpful sizing information for the femoral stem.

Bone quality is initially assessed. The selection of an EMPERION stem for use in a primary total hip arthroplasty is ultimately dependent on surgeon choice. Modular primary femoral stems are particularly beneficial when addressing: metaphyseal/diaphyseal size mismatch (eg, the 'champagne-flute'/Type A femur); cases of developmental dysplasia of the hip; post-traumatic femoral deformities; and younger, high-demand patients. Given the multitude of prosthetic combinations, the modular EMPERION stem can be considered for use in any or all primary total hip arthroplasty cases.

Radiographic leg length discrepancy is ascertained next using the A/P pelvic x-ray.

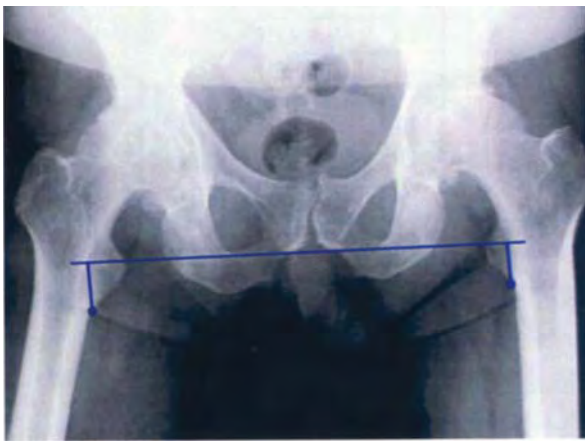


Figure 1

A horizontal reference line is drawn across the pelvis through the inferior aspect of the teardrops; alternatively the obturator foramen or the ischial tuberosities can also be used. Select a reference point along the femur, such as the tip of the greater trochanter or the top or bottom of the lesser trochanter. The vertical distance from the horizontal line that has been drawn to the reference point on both femurs is measured. The difference in these measurements indicates the patient's radiographic leg length discrepancy (Figure 1). This information should then be utilized in context of the preoperative clinical measurement of the patient's leg lengths – in order to accurately restore limb length. Intraoperative verification is performed by the surgeon to determine final limb length. The intraoperative technique chosen will be determined by patient positioning (supine or decubitus positioning), surgical approach and surgeon preference.

Next, lateral femoral offset or displacement can be measured. The anatomic axis of the proximal femur is identified. Lateral femoral offset is measured as the horizontal distance from the anatomic axis to the center of the femoral head. To accurately assess the need for a standard or high offset femoral stem, the ideal position of the acetabular cup must also be determined. If medialization of the cup is anticipated, a high offset stem may be necessary to accurately restore femoral offset. Measurement of lateral femoral displacement can be incorporated in

radiographic templating. Femoral displacement is measured as the distance from the anatomic axis of the femur to a fixed point on the pelvis, such as the teardrop or pubic symphysis. The need for a standard or high offset femoral stem can be determined based upon the measured femoral offset and displacement. Direct lateralization without limb lengthening is achieved through the use of a high offset stem. Lengthening through the femoral head options (ie, +4, +8, +12 or +16mm) will result in both increased limb length and femoral offset.

The A/P and lateral radiographs of the hip should be templated to determine EMPERION® stem and sleeve size and prosthetic positioning. Radiographic magnification should be accounted for during templating. The junction of the lateral femoral neck and greater trochanter serves as a good reference point for placement of the x-ray templates. This junction should approximate the previously drawn line representing the anatomic axis of the femur. Place a mark at this junction and in the center of the femoral head. Using the A/P radiograph, place the femoral templates over the proximal femur of both the affected and unaffected hips (Figure 2). Find the appropriate stem and sleeve combination that will maximize the metaphyseal and diaphyseal fit and fill of the proximal femur.

Since the EMPERION instrumentation is designed to reference from the tip of the greater trochanter, it is helpful to assess femoral neck height and the neck shaft angle. The height of the prosthetic femoral neck is dependent on stem size (range 26–30mm; refer to page 15, Section 1). If desired, an additional horizontal reference line can be drawn on the A/P pelvic x-ray across the tip of both greater trochanters. In a hip with a neutral neck anatomy, this line will bisect the center of rotation of the femoral head. In cases of coxa vara, the center of rotation will fall below this line. In cases of coxa valga, the center of rotation will be above this reference line. Adjustment of the level of the femoral osteotomy and the final vertical position of the stem and sleeve may need to be adjusted if an underlying coxa vara or coxa valga condition is identified.

The final selection and positioning of the EMPERION stem and sleeve will ultimately be determined by the integration of the preoperative templating information and the intraoperative clinical feedback.

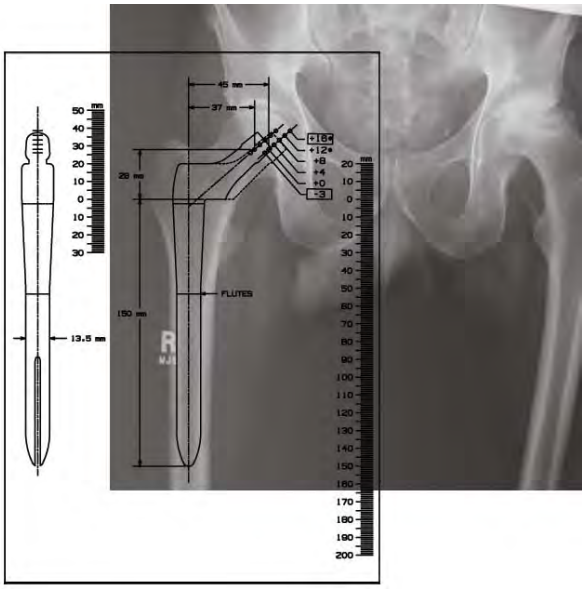


Figure 2

Revision Surgery Preoperative Planning

by Mathias Bostrom, MD

As for primary total hip arthroplasty, preoperative planning for revision total hip arthroplasty is critical for an optimal clinical outcome. Many of the principles of preoperative planning that are applicable in the primary total hip arthroplasty setting are also applicable to the revision setting. The fundamental goal of revision surgery remains the same as with primary total hip revision: that of obtaining a stable, pain-free implant with restoration of leg lengths.

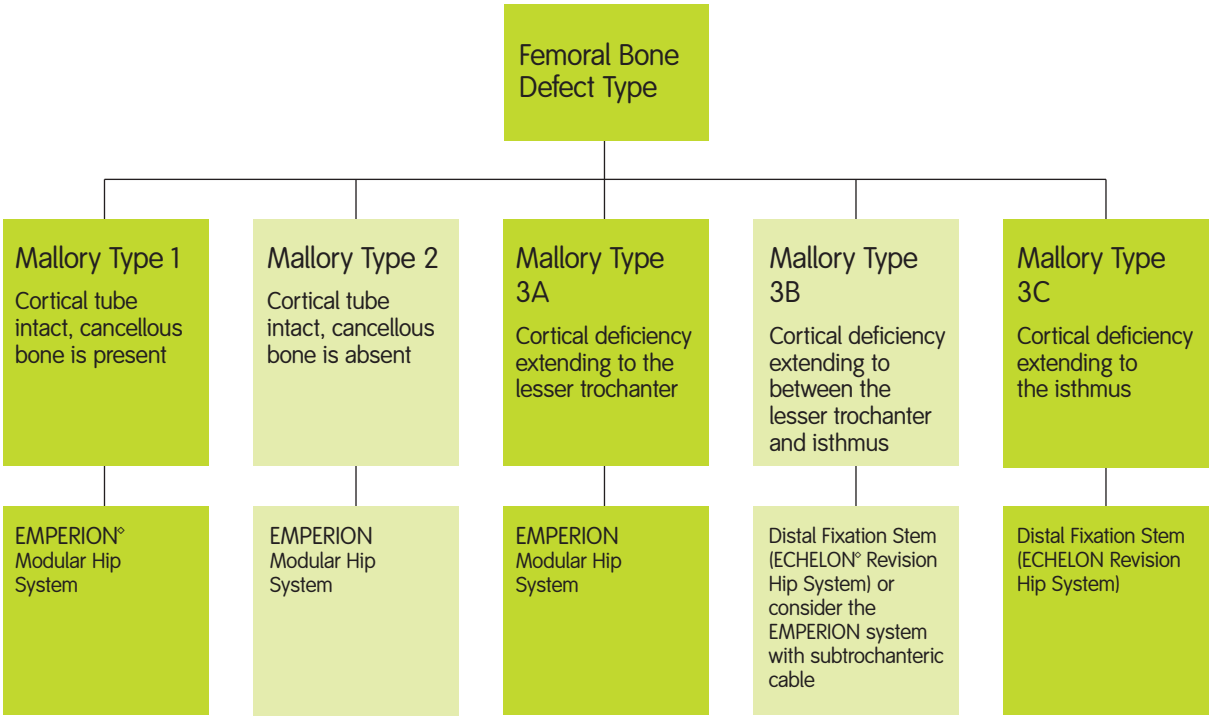
To achieve this goal is usually more complicated however. As with primary hip arthroplasty, proper attention must be paid to assessing limb length and femoral offset, choosing optimal prosthetic size and determining quality and location of remaining bone stock. The surgeon must also assess a number of other factors in regards to preoperative planning that are dependent on the cause for the revision. Specific questions include: What is the reason for the revision? Is the implant loose, infected or unstable? Is there cement or is there an uncemented component requiring specialized removal equipment? Once the implant is removed how much remaining bone will there be? It is beyond the scope of this technique manual to address all these questions, but it will hopefully provide a systematic approach to how a proximally loading modular total hip revision system can be utilized to achieve a successful arthroplasty revision.

Preoperative planning for a revision total hip arthroplasty requires at a minimum a standard set of radiographs, which includes an antero-posterior radiograph of the pelvis and a lateral radiograph of the affected hip. Depending on the length of the existing femoral component several additional radiographs are often necessary. Specifically, if the anteroposterior pelvis radiograph and lateral radiograph do not include the entire femoral component, additional anteroposterior and lateral views may be necessary so that the entire femoral component is visualized. On occasion a full-length antero-posterior radiograph of the entire femur may be necessary. As part of the preoperative work-up the surgeon may consider other imaging modalities such bone scans and computerized tomography, but these are not necessary for preoperative templating.

The most critical aspect of preoperative planning for total hip arthroplasty is assessing the bone stock available for implant fixation once the current implant has been removed. Use of the EMPERION® system requires adequate metaphyseal bone stock for successful use. Fortunately, most femoral revisions have adequate metaphyseal bone stock. In general, Mallory Type 1 and Type 2 defects are ideal for modular proximally loading femoral revision systems such as the EMPERION system. Similarly Mallory Type 3A defects can be well accommodated by this revision system, especially since there are long sleeve options which are not available with other systems. Special consideration can be made for Mallory Type 3B defects: if there is sufficient bone then these types of defects may be tackled with the EMPERION system using a long sleeve and a supplementary subtrochanteric cerclage cable. Use of the EMPERION system in this setting is entirely dependent on obtaining secure fixation of the implant in the intraoperative setting. However if there is not sufficient structurally sound bone such as in Mallory Type 3C defects, a system such as the EMPERION one should not be utilized. Similarly if an extended trochanteric osteotomy is required for removal of the current implant, the EMPERION system may not be the preferred option.

The proximal bone in the metaphyseal portion of the femoral does not have to be anatomic, for significant proximal femoral deformity is accommodated with this system. One of the primary strengths of this system is that it allows a significant mismatch between the metaphyseal/diaphyseal portions of the femur, which is often the case in revision settings. This stem design also allows proximal loading of the femoral bone, minimizing stress-shielding, which is one of the fundamental advantages of a system such as the EMPERION Modular Hip System.

Assessing bone stock



As with primary total hip preoperative planning, establishing proper leg lengths requires assessment of a number of clinical and radiograph parameters. Establishing the proper reference lines requires using a horizontal line between the inferior portion of the teardrop as well as a horizontal line between the inferior margin of the obturator foramen and ischial tuberosity. Due to the often distorted anatomy in the revision setting, utilizing all three reference lines may be necessary. Similarly, due to bony defects on the femoral side, a combination of anatomic landmarks such as the superior margin of the greater trochanter and inferior margin of the lesser trochanter must be utilized. These obviously need to be compared to similar points in the contralateral side using the anteroposterior radiograph. Any pelvic obliquities and/or spinal deformity must also be taken into account based on radiographic and clinical assessments. Use of simple wooden blocks during the preoperative physical examination of the patient is very useful, as is discussion of the patient's perceived length elicited during preoperative interview of the patient. While seemly complex, consideration of all these factors will lead to the successful restoration of proper leg length.

The anteroposterior radiograph is also critical in assessing proper femoral offset. If there is native hip on the contralateral side, the proper offset can be determined by the horizontal distance between the center of rotation of the head and anatomic axis of the femur. If there is a well functioning total hip prosthesis on the contralateral side, a similar assessment can be made. These measurements are then used when the acetate templates are placed on the anteroposterior radiograph. Ideally, proper femoral offset can be achieved with either the standard offset or the high offset options of the EMPERION system without altering the leg lengths.

Difficulties sometimes arise when the contralateral hip is deformed or has malfunctioning total hip arthroplasty. Additional problems may be encountered if the ipsilateral

Revision Surgery Preoperative Planning (continued)

acetabulum has failed or has a protrusio deformity. In these problematic cases it is up to the surgeon to determine intraoperatively what the proper offset should be so as to achieve a hip that is stable in all physiological positions without impingement.

Once the bone stock has been assessed and the proper leg lengths and offset has been determined, the acetabular templates are placed on the anteroposterior radiograph. Initially the femoral stem template is laid down on the radiograph so as to establish the proper length and diameter of the implant. The choice of the standard stem or calcar stem is established based on the location of the proper center of rotation. The bowed long revision stem must be templated on the proper lateral radiograph. If there is any compromise in the diaphyseal femoral bone, it is recommended that the implant bypass the deficient bone by at least two diaphyseal bone diameters.

Once a preliminary estimate of the proper femoral stem size is accomplished, the proper cone must be established using a similar technique. Use of the longer cone (60mm) is determined by the quality of the bone in the metaphyseal/diaphyseal region. If there is a concern regarding the quality of the proximal diaphyseal bone, the longer cone is usually recommended.

After the preliminary femoral stem and cone sizes are established, physically drawing these on the anteroposterior radiograph of the proximal femur in proper position is highly recommended. This drawing is often invaluable when selecting the proper implant in conjunction with intraoperative findings so as to establish the proper position of the implant.

While approaching preoperative planning in the revision setting may seem daunting at first, a systemic approach of preoperative planning will lead to an expeditious and clinically successful revision surgery.

1. Femoral Neck Osteotomy

An osteotomy guide is available for proximal bone resection. The osteotomy guide has a vertical scale in 5mm increments to help gauge neck height.

Using the greater trochanter or other anatomical landmark as a reference, align the osteotomy guide and determine the location of the appropriate resection (Figure 3).

The chart below indicates the distance from the neutral head center to the top of the sleeve. When a +10 or +20 calcar neck is selected, move the osteotomy guide down the femur to ensure that sufficient bone will be removed to achieve the proper leg length. Once the appropriate vertical position of the osteotomy guide has been verified, the proposed horizontal osteotomy level is marked with a marking pen or electrocautery. The femoral osteotomy can then be made obliquely to the desired level along the medial aspect of the femoral neck, taking care to protect the greater trochanter during the osteotomy. The additional bone left above the osteotomy level can subsequently be resected with a ronguer or can be left until final seating of the trial sleeve has been accomplished, at which time a clean-up cut can be made flush with the top of the sleeve trial (Figure 4).

Figure 3

Figure 4

Distal diameter of stem (mm)	Distance from +0mm head center to top of sleeve
9/11	28mm
13/15	30mm
17/19	32mm
21/23	34mm

Surgeon Tip

Dr Kaper: "I like to make a high neck or sub-capital osteotomy. Be sure not to leave a notch in greater trochanter if making transverse cut."

2. Acetabular Preparation

The acetabulum should be prepared in the recommended fashion for the acetabular component to be utilized according to preoperative planning and templating.

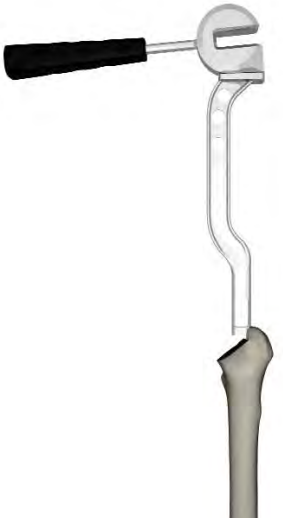


Figure 5

3. Femoral Canal Preparation

For Primary:

Open the medullary canal with the box osteotome (Figure 5). Sound the femoral canal using the canal finder and the reamer T-handle (Figure 6).

For Revision:

Begin with a distal reamer that is 4–6mm smaller than the templated size or a reamer that has little or no resistance.

Note It is important to stay lateral with both the box osteotome and canal finder. This helps ensure that femoral reaming will be in alignment with the femoral axis.

Figure 6

The trochanteric reamer can be used to remove lateral bone (Figure 7). Removing lateral bone is important for maintaining neutral stem placement.

Surgeon Tip

Dr Kaper: "I like to lever off the blunt nose of the trochanteric reamer to lateralize the trochanter."

Figure 7

4. Femoral Distal Reaming

Primary and Standard Revision Stems

Use the depth marks on the reamers, which correspond to the neutral head center of the prosthesis, to gauge the appropriate reaming depth. The depth marks are designed to reference the greater trochanter (Figure 8).

Continue to enlarge femoral canal sequentially using the distal reamers. Ream the canal in 0.5mm increments until the last reamer matches the selected implant size. The actual size of the flutes is 0.5mm greater than the equivalent reamer. For example, if you are using a 13mm stem, the distal diameter is actually 13.5mm, providing an automatic 0.5mm of press-fit. Size designation and color-coded bands are used on the appropriate reamers to represent the size of the implant they represent. **The final reamer size may need to be adjusted based on bone quality, anatomy and surgeon preference.**

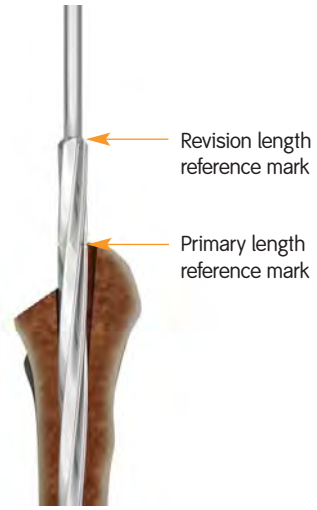


Figure 8

Long Revision Bowed Stems

Thin shaft reamers are available for the long revision bowed stems. Begin reaming the canal with the straight reamers in 0.5mm increments until the reamer size matches the selected implant size. After reaming with the straight reamers, ream with the thin shaft reamers to ensure that the stem will fit through the bow of the stem (Figure 9). **The final reamer size may need to be adjusted based on bone quality, anatomy and surgeon preference.**

Use the depth marks on the thin shaft reamers, which correspond to the neutral head center of the prosthesis, to gauge the appropriate reaming depth.

Figure 9

Note This technique is different than traditional bowed stem techniques. Usually one will over ream by 0.5–1.0mm to ensure that the stem will be able to pass the femoral bow without fracturing the femur. This bowed stem is different because it transitions into a diameter 1mm smaller just prior to the bow (Figure 10). Therefore, when reaming line-to-line, the canal will be over reamed by 0.5mm, with respect to the outer diameter of the flutes, for the distal, bowed portion of the stem. This feature will minimize the risk of fracture during insertion.

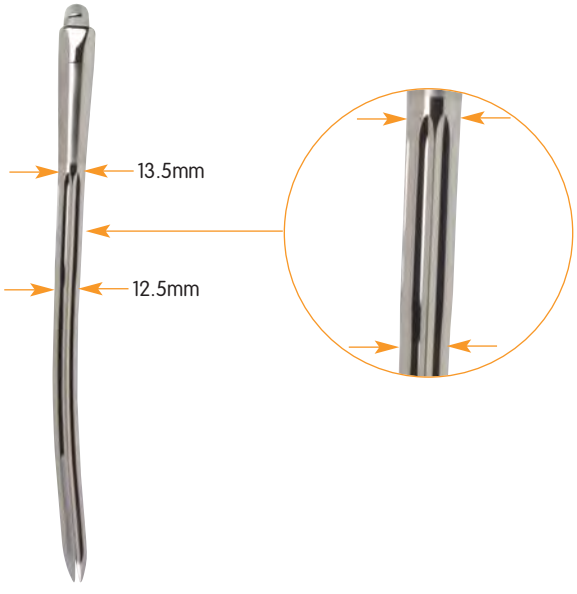


Figure 10

5. Femoral Proximal Reaming

Use the proximal reamers to prepare the femur for the modular sleeve implant. There are standard reamers available for the standard length sleeves and tall reamers for the tall sleeves. These reamers are sized according to cone size and distal diameter (Figure 11).

First select the reamer with the smallest cone size that corresponds with the distal diameter of the stem. (For example, for a size 13, select a 13S proximal reamer.) Each proximal reamer has color-coded bands to represent the distal diameters corresponding to each proximal reamer.

Choose a pilot that matches the stem diameter and assemble it to the proximal reamer. In the case that the greater trochanter does not exist, reference the laser line near the proximal flute, which is equivalent to the top of the sleeve, once seated. Increase the reamer size until cortical contact is achieved. Keep in mind that a combination of S, M, L and XL options are available for each stem diameter. Pilot extenders may be utilized in combination with the pilot to reach the approximate length of the standard revision stems.

Be sure to keep drill in forward as reverse direction may cause the pilots to loosen.

Figure 11

Surgeon Tip

Dr Kaper: "I like to have all three proximal reamers loaded with pilots to speed up the operation."

Standard proximal reamers	
Reamer	Size
1	9S
2	11S/9M
3	13S/11M/9L
4	15S/13M/11L
5	17S/15M/13L
6	19S/17M/15L
7	21S/19M/17L
8	23S/21M/ 19L/17XL
9	23M/21L/19XL
10	23L/21XL
11	23XL

Tall proximal reamers	
Reamer	Size
2T	11S
3T	13S/11M
4T	15S/13M/11L
5T	17S/15M/13L
6T	19S/17M/15L
7T	21S/19M/17L
8T	23S/21M/ 19L/17XL

Proximal reamer loaded with pilot

6. Milling of Spout for Proximal Sleeve

First select the spout cutter that corresponds to the size of the stem you are implanting. The spout cutter will have a size designation and color-coded band that represents the corresponding distal diameter of the stem. Attach this to the miller handle assembly.

Then select the milling frame that corresponds with the last proximal reamer that was used. The frames are labeled with both the corresponding frame numbers and the sizes. The top of the frame will have slots that correspond with the size of spout you are planning to use (Figure 12). Assemble the milling body to a pilot that matches the pilot utilized in the proximal reamer step. Assemble the milling frame onto the milling handle assembly and select the slot that matches the spout size of the sleeve implant by pulling back on the black anodized quick connect of the T-handle.

Be sure to engage the slot in order to keep the relationship between the spout and cone accurate.

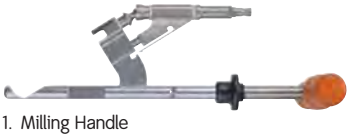
Figure 12

Accu-Miller

The miller has been designed to be as accurate as possible when preparing the spout. The locking slot maintains the relationship of the spout and cone to accurately match that of the implant sleeve.

Note Tall sleeves are only available for small and medium cones with #1 and #2 spouts.

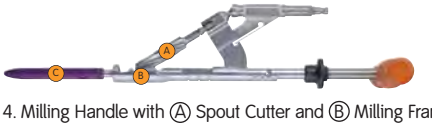
Milling Assembly



1. Milling Handle

2. Milling Handle with Ⓐ Spout Cutter

3. Milling Handle with Ⓐ Spout Cutter and Ⓑ Milling Frame



4. Milling Handle with Ⓐ Spout Cutter and Ⓑ Milling Frame and Ⓒ Pilot

A. Spout Cutter

B. Milling Frame

C. Pilot

6. Milling of Spout for Proximal Sleeve (continued)

Frame no.	Size
1	9S
2	11S/9M
3	13S/11M/9L
4	15S/13M/11L
5	17S/15M/13L
6	19S/17M/15L

Frame no.	Size
7	21S/19M/17L
8	23S/21M/19L/17XL
9	23M/21L/19XL
10	23L/21XL
11	23XL

Note Milling frame numbers will coincide with the number of the last proximal reamer used.

Insert milling frame assembly into femur (Figure 13). Start with the number 1 spout and progress upward until the spout cutter/reamer reaches cortical bone. Attach drill and start drilling prior to inserting spout cutter into femur. Mill spout until the frame assembly is fully seated. You can check the seating by matching the appropriate neck height to the greater trochanter.

Note In the case that the greater trochanter does not exist, you can reference the top of the major diameter of the cone which is equivalent to the top of the sleeve, once seated (Figure 14).

Figure 13

7. Sleeve and Stem Trialing

Primary and Standard Revision Stems

First select the trial sleeve that corresponds with the correct distal diameter, cone and spout that was reamed. Then assemble the trial sleeve to the corresponding pilot. Pilot extenders can be used for the standard and long revision stems. Make sure the colors all match.

Note Trial sleeves have 0.25mm press-fit, while pilots are 1mm undersized from reamer.

There are two methods for inserting the trial into the femur:

Figure 14

Method 1

Assemble the stem inserter pommel into the threaded hole and insert the trial assembly into the femur and use a mallet to make sure that the trial is properly seated. Select the trial neck that corresponds to the correct offset or calcar adjustment for the implant. Sizes 9mm and 11mm, 13mm and 15mm, 17mm and 19mm, and 21mm and 23mm femoral stems share trial necks, respectively. Using the quick-connect mechanism, snap the neck into the properly sized trial stem.

Method 2

First, using the quick-connect mechanism, snap the neck into the properly sized trial stem. Then insert the trial neck inserter in the slot on the top of the trial neck. Insert the trial into the femur. Light tapping of the trial neck inserter may be necessary (Figure 14).

Methods 1 and 2

The version of the neck can be adjusted by pushing the button on the top of the trial neck. Trial version control options are in 20° increments (Figure 15).

Figure 15

Place the desired trial femoral head on the trial neck and reduce the hip to assess stability and range of motion. To remove trial assembly, screw the trial removal hook onto the trial removal handle. The hook then inserts into the hole in the trial neck.

7. Sleeve and Stem Trialing (continued)

Using the slotted mallet, remove the trial assembly.

Long Revision Bowed Stems

The size of the bow must be evaluated to ensure the stem will fit properly. Bowed sounds are provided for this reason. The cone portion of each bowed sound is sized to fit the small cone with 0.25mm of press-fit. If you have reamed to a larger sized cone, sleeves are provided for M, L, and XL sleeve options. The sleeve will slide over the bowed sound and snap over the original cone.

Note The cone of the bowed trial has 0.25mm press-fit and the shaft is 0.5mm undersized from the ream.

There are two different methods for inserting the bowed sounds:

Method 1

Screw the sound insertion handle into the threaded hole at the proximal end of the appropriate sized bowed sound. Then insert this into the femur to assess the bowed stem fit (Figure 16). Select the trial neck that corresponds to the correct implant. Using the quick-connect mechanism, snap the neck into the properly sized trial stem.

Figure 16

Method 2

First, using the quick-connect mechanism, snap the neck into the properly sized bowed sound. Then insert the trial neck inserter in the slot on the top of the trial neck. Insert the trial into the femur. Lightly tapping of the trial neck inserter may be necessary.

Methods 1 and 2

The version in the bowed stem trial matches the 15° of built-in anteversion of the bowed implant. The bowed trials have two options for neck version, depending on whether a right or left implant is required. For a left implant, make sure the ball on the back of the neck lines up with the L on the trial. For a right implant, make sure the ball on the back of the neck lines up with the R.

Place the desired trial femoral head on the trial neck and reduce the hip to assess stability and range of motion. To remove trial assembly, screw the trial removal hook onto the trial removal handle. The hook then inserts into the hole in the trial neck. Using the slotted mallet, remove the trial assembly.

Spouts are not included in the bowed sound. In order to trial the spout of the implant, the trials for the straight stems may be used.

To remove the bowed sound, remove the trial neck from the sound. Then screw the trial removal handle directly into the sound. Then carefully use a slotted mallet to remove the sound. Do not use the trial removal hook to remove the bowed sound. This could lead to stripping the quick-connect trial.

Long revision (bowed) trial stem, sleeve and neck

8. Sleeve and Stem Implant Insertion

Primary and Standard Revision Stems

When inserting the implant, the sleeve should be implanted first. Use the sleeve insertion tool to implant the sleeve. The tool consists of a cone that matches the distal diameter of the stem. This cone has a size designation and color-coded band representing the corresponding distal diameter. The cone snaps into the sleeve insertion handle and has a pilot that screws into it. The cone has pegs that slide into the slots on the sleeve implant for version control (Figure 17). Once assembled, this tool can slide through the sleeve. Use a mallet to impact the sleeve implant.

To insert the stem implant, engage the tip of the stem inserter frame and pommel assembly into the stem driver slot on the implant and turn the pommel to thread the inserter onto the implant (Figures 18–21). Fully tighten the pommel before impaction.

Insert the implant through the sleeve into the canal with hand pressure and verify proper implant version. Use firm mallet blows to seat the implant to the desired level.

Figure 17 Figure 18 Figure 19

Note Once the implant flutes have engaged the bone, the implant version cannot be changed without removing the implant. The implant can be removed by using the separation tool to separate the sleeve from the stem and then striking the underside of the threaded stem driver with a slotted mallet.

Note If sleeve needs to be removed after implanting, a sleeve removal tool is provided. Insert the tool through the implanted sleeve. The hook will engage on the distal chamber of the sleeve implant. Using a slotted mallet, remove the sleeve by lightly striking the underside of the sleeve removal tool.

Surgeon Tip:

Dr Kaper: "I like to leave sleeve 3–4mm proud and then impact stem and sleeve into the final position."

Figure 20 Figure 21

Long Revision Bowed Stems

When implanting bowed stems, first loosely place the sleeve implant onto the stem implant. Then advance the stem as far as possible down the femur (Figure 22). Attach the stem inserter frame and pommel assembly to the stem as shown for the straight stem. Making sure the neck version and sleeve position are correct, use firm mallet blows to seat the implant.

If the bowed stem stops progressing during insertion, remove the implant and enlarge the canal using a larger thin shaft reamer than was previously used.

Note A fully seated bowed stem will be extremely difficult to remove from the femur and may require an osteotomy to remove.

Figure 22

9. Implant Trialing

Once the implant is fully seated, perform a final trial reduction to determine appropriate neck length. Place the desired trial femoral head on the implant and reduce the hip to assess stability and range of motion.

10. Femoral Head Assembly

Clean and dry the taper with a sterile cloth, place the prosthetic femoral head on the neck and firmly impact several times with a femoral head impactor and a mallet.

EMPERION® System Catalog Information – Implants

HA Coated Standard Length Sleeves

Cat. no.	Description
7129-0911	EMPERION Sleeve 9 S Cone 1 Spout Slotted
7129-0912	EMPERION Sleeve 9 S Cone 2 Spout Slotted
7129-0913	EMPERION Sleeve 9 S Cone 3 Spout Slotted
7129-0921	EMPERION Sleeve 9 M Cone 1 Spout Slotted
7129-0922	EMPERION Sleeve 9 M Cone 2 Spout Slotted
7129-0923	EMPERION Sleeve 9 M Cone 3 Spout Slotted
7129-0931	EMPERION Sleeve 9 L Cone 1 Spout Slotted
7129-0932	EMPERION Sleeve 9 L Cone 2 Spout Slotted
7129-0933	EMPERION Sleeve 9 L Cone 3 Spout Slotted
7129-1651	EMPERION Sleeve 11 S Cone 1 Spout Slotted
7129-1652	EMPERION Sleeve 11 S Cone 2 Spout Slotted
7129-1653	EMPERION Sleeve 11 S Cone 3 Spout Slotted
7129-1654	EMPERION Sleeve 11 M Cone 1 Spout Slotted
7129-1655	EMPERION Sleeve 11 M Cone 2 Spout Slotted
7129-1656	EMPERION Sleeve 11 M Cone 3 Spout Slotted
7129-1657	EMPERION Sleeve 11 L Cone 1 Spout Slotted
7129-1658	EMPERION Sleeve 11 L Cone 2 Spout Slotted
7129-1659	EMPERION Sleeve 11 L Cone 3 Spout Slotted
7129-1661	EMPERION Sleeve 13 S Cone 1 Spout Slotted
7129-1662	EMPERION Sleeve 13 S Cone 2 Spout Slotted
7129-1663	EMPERION Sleeve 13 S Cone 3 Spout Slotted
7129-1664	EMPERION Sleeve 13 M Cone 1 Spout Slotted
7129-1665	EMPERION Sleeve 13 M Cone 2 Spout Slotted
7129-1666	EMPERION Sleeve 13 M Cone 3 Spout Slotted
7129-1667	EMPERION Sleeve 13 L Cone 1 Spout Slotted
7129-1668	EMPERION Sleeve 13 L Cone 2 Spout Slotted
7129-1669	EMPERION Sleeve 13 L Cone 3 Spout Slotted
7129-1671	EMPERION Sleeve 15 S Cone 1 Spout Slotted
7129-1672	EMPERION Sleeve 15 S Cone 2 Spout Slotted
7129-1673	EMPERION Sleeve 15 S Cone 3 Spout Slotted
7129-1674	EMPERION Sleeve 15 M Cone 1 Spout Slotted
7129-1675	EMPERION Sleeve 15 M Cone 2 Spout Slotted
7129-1676	EMPERION Sleeve 15 M Cone 3 Spout Slotted
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7129-1679	EMPERION Sleeve 15 L Cone 3 Spout Slotted
7129-1681	EMPERION Sleeve 17 S Cone 1 Spout Slotted
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7129-1684	EMPERION Sleeve 17 M Cone 1 Spout Slotted
7129-1685	EMPERION Sleeve 17 M Cone 2 Spout Slotted
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7129-1688	EMPERION Sleeve 17 L Cone 2 Spout Slotted
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7129-1697	EMPERION Sleeve 19 L Cone 1 Spout Slotted
7129-1698	EMPERION Sleeve 19 L Cone 2 Spout Slotted
7129-1699	EMPERION Sleeve 19 L Cone 3 Spout Slotted
7129-1741	EMPERION Sleeve 17 XL Cone 1 Spout Slotted
7129-1742	EMPERION Sleeve 17 XL Cone 2 Spout Slotted
7129-1743	EMPERION Sleeve 17 XL Cone 3 Spout Slotted
7129-1941	EMPERION Sleeve 19 XL Cone 1 Spout Slotted
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7129-1943	EMPERION Sleeve 19 XL Cone 3 Spout Slotted
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7129-1827	EMPERION Sleeve 21 L Cone 3 Spout Slotted
7129-1828	EMPERION Sleeve 23 S Cone 1 Spout Slotted
7129-1829	EMPERION Sleeve 23 S Cone 2 Spout Slotted
7129-1830	EMPERION Sleeve 23 S Cone 3 Spout Slotted
7129-1831	EMPERION Sleeve 23 M Cone 1 Spout Slotted
7129-1832	EMPERION Sleeve 23 M Cone 2 Spout Slotted
7129-1833	EMPERION Sleeve 23 M Cone 3 Spout Slotted
7129-1834	EMPERION Sleeve 23 L Cone 1 Spout Slotted
7129-1835	EMPERION Sleeve 23 L Cone 2 Spout Slotted
7129-1836	EMPERION Sleeve 23 L Cone 3 Spout Slotted
7129-2141	EMPERION Sleeve 21 XL Cone 1 Spout Slotted
7129-2142	EMPERION Sleeve 21 XL Cone 2 Spout Slotted
7129-2143	EMPERION Sleeve 21 XL Cone 3 Spout Slotted
7129-2341	EMPERION Sleeve 23 XL Cone 1 Spout Slotted
7129-2342	EMPERION Sleeve 23 XL Cone 2 Spout Slotted
7129-2343	EMPERION Sleeve 23 XL Cone 3 Spout Slotted

HA Coated Tall Length Sleeves

Cat. no.	Description
7129-1817	EMPERION® Sleeve 11 S Cone 1 Spout Slotted Tall
7129-1818	EMPERION Sleeve 11 M Cone 1 Spout Slotted Tall
7129-1819	EMPERION Sleeve 11 S Cone 2 Spout Slotted Tall
7129-1128	EMPERION Sleeve 11 M Cone 2 Spout Slotted Tall
7129-1837	EMPERION Sleeve 13 S Cone 1 Spout Slotted Tall
7129-1703	EMPERION Sleeve 13 S Cone 2 Spout Slotted Tall
7129-1704	EMPERION Sleeve 13 M Cone 1 Spout Slotted Tall
7129-1705	EMPERION Sleeve 13 M Cone 2 Spout Slotted Tall
7129-1706	EMPERION Sleeve 15 S Cone 1 Spout Slotted Tall
7129-1707	EMPERION Sleeve 15 S Cone 2 Spout Slotted Tall
7129-1708	EMPERION Sleeve 15 M Cone 1 Spout Slotted Tall
7129-1709	EMPERION Sleeve 15 M Cone 2 Spout Slotted Tall
7129-1801	EMPERION Sleeve 17 S Cone 1 Spout Slotted Tall
7129-1802	EMPERION Sleeve 17 S Cone 2 Spout Slotted Tall
7129-1803	EMPERION Sleeve 17 M Cone 1 Spout Slotted Tall
7129-1804	EMPERION Sleeve 17 M Cone 2 Spout Slotted Tall
7129-1805	EMPERION Sleeve 19 S Cone 1 Spout Slotted Tall
7129-1806	EMPERION Sleeve 19 S Cone 2 Spout Slotted Tall
7129-1807	EMPERION Sleeve 19 M Cone 1 Spout Slotted Tall
7129-1808	EMPERION Sleeve 19 M Cone 2 Spout Slotted Tall
7129-1809	EMPERION Sleeve 21 S Cone 1 Spout Slotted Tall
7129-1810	EMPERION Sleeve 21 S Cone 2 Spout Slotted Tall
7129-1811	EMPERION Sleeve 21 M Cone 1 Spout Slotted Tall
7129-1812	EMPERION Sleeve 21 M Cone 2 Spout Slotted Tall
7129-1813	EMPERION Sleeve 23 S Cone 1 Spout Slotted Tall
7129-1814	EMPERION Sleeve 23 S Cone 2 Spout Slotted Tall
7129-1815	EMPERION Sleeve 23 M Cone 1 Spout Slotted Tall
7129-1816	EMPERION Sleeve 23 M Cone 2 Spout Slotted Tall

Polished Primary Stems

Cat. no.	Description
7129-0901	EMPERION Stem 9 Primary RO
7129-0902	EMPERION Stem 9 Primary SO
7129-1101	EMPERION Stem 11 Primary SO
7129-1102	EMPERION Stem 11 Primary HO
7129-1301	EMPERION Stem 13 Primary SO
7129-1302	EMPERION Stem 13 Primary HO
7129-1501	EMPERION Stem 15 Primary SO
7129-1502	EMPERION Stem 15 Primary HO
7129-1701	EMPERION Stem 17 Primary SO
7129-1702	EMPERION Stem 17 Primary HO
7129-1901	EMPERION Stem 19 Primary SO
7129-1902	EMPERION Stem 19 Primary HO

Polished Standard Revision Stems

Cat. no.	Description
7129-1150	EMPERION Stem 11 Short Rev Pol +0
7129-1151	EMPERION Stem 11 Short Rev Pol +10
7129-1350	EMPERION Stem 13 Short Rev Pol +0
7129-1351	EMPERION Stem 13 Short Rev Pol +10
7129-1550	EMPERION Stem 15 Short Rev Pol +0
7129-1551	EMPERION Stem 15 Short Rev Pol +10
7129-1750	EMPERION Stem 17 Short Rev Pol +0
7129-1751	EMPERION Stem 17 Short Rev Pol +10
7129-1950	EMPERION Stem 19 Short Rev Pol +0
7129-1951	EMPERION Stem 19 Short Rev Pol +10
7129-2150	EMPERION Stem 21 Short Rev Pol +0
7129-2151	EMPERION Stem 21 Short Rev Pol +10
7129-2350	EMPERION Stem 23 Short Rev Pol +0
7129-2351	EMPERION Stem 23 Short Rev Pol +10

Polished Long Revision Stems (Bowed)

Cat. no.	Description
7129-1170	EMPERION Stem 11 Long Rev Pol +0 L
7129-1171	EMPERION Stem 11 Long Rev Pol +0 R
7129-1172	EMPERION Stem 11 Long Rev Pol +10 L
7129-1173	EMPERION Stem 11 Long Rev Pol +10 R
7129-1174	EMPERION Stem 11 Long Rev Pol +20 L
7129-1175	EMPERION Stem 11 Long Rev Pol +20 R
7129-1370	EMPERION Stem 13 Long Rev Pol +0 L
7129-1371	EMPERION Stem 13 Long Rev Pol +0 R
7129-1372	EMPERION Stem 13 Long Rev Pol +10 L
7129-1373	EMPERION Stem 13 Long Rev Pol +10 R
7129-1374	EMPERION Stem 13 Long Rev Pol +20 L
7129-1375	EMPERION Stem 13 Long Rev Pol +20 R
7129-1570	EMPERION Stem 15 Long Rev Pol +0 L
7129-1571	EMPERION Stem 15 Long Rev Pol +0 R
7129-1572	EMPERION Stem 15 Long Rev Pol +10 L
7129-1573	EMPERION Stem 15 Long Rev Pol +10 R
7129-1574	EMPERION Stem 15 Long Rev Pol +20 L
7129-1575	EMPERION Stem 15 Long Rev Pol +20 R
7129-1770	EMPERION Stem 17 Long Rev Pol +0 L
7129-1771	EMPERION Stem 17 Long Rev Pol +0 R
7129-1772	EMPERION Stem 17 Long Rev Pol +10 L
7129-1773	EMPERION Stem 17 Long Rev Pol +10 R
7129-1774	EMPERION Stem 17 Long Rev Pol +20 L
7129-1775	EMPERION Stem 17 Long Rev Pol +20 R
7129-1970	EMPERION Stem 19 Long Rev Pol +0 L
7129-1971	EMPERION Stem 19 Long Rev Pol +0 R
7129-1972	EMPERION Stem 19 Long Rev Pol +10 L
7129-1973	EMPERION Stem 19 Long Rev Pol +10 R
7129-1974	EMPERION Stem 19 Long Rev Pol +20 L
7129-1975	EMPERION Stem 19 Long Rev Pol +20 R
7129-2170	EMPERION Stem 21 Long Rev Pol +0 L
7129-2171	EMPERION Stem 21 Long Rev Pol +0 R
7129-2172	EMPERION Stem 21 Long Rev Pol +10 L
7129-2173	EMPERION Stem 21 Long Rev Pol +10 R
7129-2174	EMPERION Stem 21 Long Rev Pol +20 L
7129-2175	EMPERION Stem 21 Long Rev Pol +20 R
7129-2370	EMPERION Stem 23 Long Rev Pol +0 L
7129-2371	EMPERION Stem 23 Long Rev Pol +0 R
7129-2372	EMPERION Stem 23 Long Rev Pol +10 L
7129-2373	EMPERION Stem 23 Long Rev Pol +10 R
7129-2374	EMPERION Stem 23 Long Rev Pol +20 L
7129-2375	EMPERION Stem 23 Long Rev Pol +20 R

Distal Reamers

Cat. no.	Description
7136-1388	8mm Distal Reamer
7136-1389	8.5mm Distal Reamer
7136-4249	9mm Distal Reamer
7136-0967	9.5mm Distal Reamer
7136-0968	10mm Distal Reamer
7136-0969	10.5mm Distal Reamer
7136-4250	11mm Distal Reamer
7136-0971	11.5mm Distal Reamer
7136-0972	12mm Distal Reamer
7136-0973	12.5mm Distal Reamer
7136-4251	13mm Distal Reamer
7136-0975	13.5mm Distal Reamer
7136-0976	14mm Distal Reamer
7136-0977	14.5mm Distal Reamer
7136-4252	15mm Distal Reamer
7136-0979	15.5mm Distal Reamer
7136-0980	16mm Distal Reamer
7136-0981	16.5mm Distal Reamer
7136-4253	17mm Distal Reamer
7136-0983	17.5mm Distal Reamer
7136-0984	18mm Distal Reamer
7136-0985	18.5mm Distal Reamer
7136-4254	19mm Distal Reamer
7136-0987	19.5mm Distal Reamer
7136-0988	20mm Distal Reamer
7136-1390	20.5mm Distal Reamer
7136-1391	21mm Distal Reamer
7136-1392	21.5mm Distal Reamer
7136-1393	22mm Distal Reamer
7136-1394	22.5mm Distal Reamer
7136-1395	23mm Distal Reamer
7136-1396	23.5mm Distal Reamer
7136-1397	24mm Distal Reamer

Thin Shaft Reamers

Cat. no.	Description
7136-4490	9mm Thin Shaft Reamer
7136-4500	10mm Thin Shaft Reamer
7136-4510	11mm Thin Shaft Reamer
7136-4515	11.5mm Thin Shaft Reamer
7136-4520	12mm Thin Shaft Reamer
7136-4525	12.5mm Thin Shaft Reamer
7136-4530	13mm Thin Shaft Reamer
7136-4535	13.5mm Thin Shaft Reamer
7136-4540	14mm Thin Shaft Reamer
7136-4545	14.5mm Thin Shaft Reamer
7136-4550	15mm Thin Shaft Reamer
7136-4555	15.5mm Thin Shaft Reamer
7136-4560	16mm Thin Shaft Reamer
7136-4565	16.5mm Thin Shaft Reamer
7136-4570	17mm Thin Shaft Reamer
7136-4575	17.5mm Thin Shaft Reamer
7136-4580	18mm Thin Shaft Reamer
7136-4585	18.5mm Thin Shaft Reamer
7136-4590	19mm Thin Shaft Reamer
7136-4595	19.5mm Thin Shaft Reamer
7136-4600	20mm Thin Shaft Reamer
7136-4605	20.5mm Thin Shaft Reamer
7136-4610	21mm Thin Shaft Reamer
7136-4615	21.5mm Thin Shaft Reamer
7136-4620	22mm Thin Shaft Reamer
7136-4625	22.5mm Thin Shaft Reamer
7136-4630	23mm Thin Shaft Reamer
7136-4635	23.5mm Thin Shaft Reamer
7136-4640	24mm Thin Shaft Reamer

Proximal Reamers

Cat. no.	Description
7136-0952	9S Proximal Reamer
7136-4111	11S/9M Proximal Reamer
7136-4112	13S/11M/9L Proximal Reamer
7136-4113	15S/13M/11L Proximal Reamer
7136-4114	17S/15M/13L Proximal Reamer
7136-4115	19S/17M/15L Proximal Reamer
7136-4116	21S/19M/17L Proximal Reamer
7136-4117	23S/21M/19L/17XL Proximal Reamer
7136-4118	23M/21L/19XL Proximal Reamer
7136-4119	23L/21XL Proximal Reamer
7136-4120	23XL Proximal Reamer

Tall Proximal Reamers

Cat. no.	Description
7136-4141	11S Tall Proximal Reamer
7136-4142	13S/11M Tall Proximal Reamer
7136-4143	15S/13M Tall Proximal Reamer
7136-4144	17S/15M Tall Proximal Reamer
7136-4145	19S/17M Tall Proximal Reamer
7136-4146	21S/19M Tall Proximal Reamer
7136-4147	23S/21M Tall Proximal Reamer
7136-4148	23M Tall Proximal Reamer

Milling Assembly

Cat. no.	Description
7136-4229	Milling Handle Assembly

Milling Frames

Cat. no.	Description
7136-0891	9S Milling Frame
7136-4230	11S/9M Milling Frame
7136-4231	13S/11M/9L Milling Frame
7136-4232	15S/13M/11L Milling Frame
7136-4233	17S/15M/13L Milling Frame
7136-4234	19S/17M/15L Milling Frame
7136-4235	21S/19M/17L Milling Frame
7136-4236	23S/21M/19L/17XL Milling Frame
7136-3203	23M/21L/19XL Milling Frame
7136-3204	23L/21XL Milling Frame
7136-3205	23XL Milling Frame

Spout Cutters

Cat. no.	Description
7136-4211	9mm Spout Cutter
7136-4212	11mm Spout Cutter
7136-4213	13mm Spout Cutter
7136-4214	15mm Spout Cutter
7136-4215	17mm Spout Cutter
7136-4216	19/21/23mm Spout Cutter

Pilots

Cat. no.	Description
7136-0944	9mm Pilot
7136-0945	11mm Pilot
7136-0946	13mm Pilot
7136-0947	15mm Pilot
7136-0948	17mm Pilot
7136-0949	19mm Pilot
7136-0950	21mm Pilot
7136-0951	23mm Pilot

EMPERION◇ Catalog Information – Instruments (continued)

Pilot Extenders

Cat. no.	Description
7136-0925	11mm Pilot Extender
7136-0926	13mm Pilot Extender
7136-0927	15mm Pilot Extender
7136-0928	17mm Pilot Extender
7136-0929	19mm Pilot Extender
7136-3201	21mm Pilot Extender
7136-3202	23mm Pilot Extender

Trial Necks

Cat. no.	Description
7136-1399	9RO Trial Neck
7136-4255	9/11 SO Trial Neck
7136-4256	11 HO/Rev Trial Neck
7136-4257	13/15 SO Trial Neck
7136-4258	13/15 HO/Rev Trial Neck
7136-4259	17–23 SO Trial Neck
7136-4260	17–23 HO/Rev Trial Neck
7136-1103	11+10 Calcar Trial Neck
7136-1104	11+20 Calcar Trial Neck
7136-4261	13/15+10 Calcar Trial Neck
7136-1504	13/15 +20 Calcar Trial Neck
7136-4262	17–23 +10 Calcar Trial Neck
7136-1904	17–23 +20 Calcar Trial Neck

Trial Sleeves

Cat. no.	Description
7136-0911	9mm S Cone 1 Spout Trial Sleeve
7136-0912	9mm S Cone 2 Spout Trial Sleeve
7136-0913	9mm S Cone 3 Spout Trial Sleeve
7136-0921	9mm M Cone 1 Spout Trial Sleeve
7136-0922	9mm M Cone 2 Spout Trial Sleeve
7136-0923	9mm M Cone 3 Spout Trial Sleeve
7136-0931	9mm L Cone 1 Spout Trial Sleeve
7136-0932	9mm L Cone 2 Spout Trial Sleeve
7136-0933	9mm L Cone 3 Spout Trial Sleeve
7136-1224	11mm S Cone 1 Spout Trial Sleeve
7136-1225	11mm S Cone 2 Spout Trial Sleeve
7136-1226	11mm S Cone 3 Spout Trial Sleeve
7136-1227	11mm M Cone 1 Spout Trial Sleeve
7136-1228	11mm M Cone 2 Spout Trial Sleeve
7136-1229	11mm M Cone 3 Spout Trial Sleeve
7136-1230	11mm L Cone 1 Spout Trial Sleeve
7136-1231	11mm L Cone 2 Spout Trial Sleeve
7136-1232	11mm L Cone 3 Spout Trial Sleeve
7136-1751	13mm S Cone 1 Spout Trial Sleeve
7136-1752	13mm S Cone 2 Spout Trial Sleeve
7136-1753	13mm S Cone 3 Spout Trial Sleeve
7136-1754	13mm M Cone 1 Spout Trial Sleeve
7136-1755	13mm M Cone 2 Spout Trial Sleeve
7136-1756	13mm M Cone 3 Spout Trial Sleeve
7136-1757	13mm L Cone 1 Spout Trial Sleeve
7136-1758	13mm L Cone 2 Spout Trial Sleeve
7136-1759	13mm L Cone 3 Spout Trial Sleeve
7136-1761	15mm S Cone 1 Spout Trial Sleeve
7136-1762	15mm S Cone 2 Spout Trial Sleeve
7136-1763	15mm S Cone 3 Spout Trial Sleeve
7136-1764	15mm M Cone 1 Spout Trial Sleeve
7136-1765	15mm M Cone 2 Spout Trial Sleeve
7136-1766	15mm M Cone 3 Spout Trial Sleeve
7136-1767	15mm L Cone 1 Spout Trial Sleeve
7136-1768	15mm L Cone 2 Spout Trial Sleeve
7136-1769	15mm L Cone 3 Spout Trial Sleeve
7136-1771	17mm S Cone 1 Spout Trial Sleeve
7136-1772	17mm S Cone 2 Spout Trial Sleeve
7136-1773	17mm S Cone 3 Spout Trial Sleeve
7136-1774	17mm M Cone 1 Spout Trial Sleeve
7136-1775	17mm M Cone 2 Spout Trial Sleeve
7136-1776	17mm M Cone 3 Spout Trial Sleeve
7136-1777	17mm L Cone 1 Spout Trial Sleeve
7136-1778	17mm L Cone 2 Spout Trial Sleeve
7136-1779	17mm L Cone 3 Spout Trial Sleeve
7136-1781	17mm XL Cone 1 Spout Trial Sleeve
7136-1782	17mm XL Cone 2 Spout Trial Sleeve
7136-1783	17mm XL Cone 3 Spout Trial Sleeve
7136-1784	19mm S Cone 1 Spout Trial Sleeve
7136-1785	19mm S Cone 2 Spout Trial Sleeve
7136-1786	19mm S Cone 3 Spout Trial Sleeve
7136-1787	19mm M Cone 1 Spout Trial Sleeve
7136-1788	19mm M Cone 2 Spout Trial Sleeve
7136-1789	19mm M Cone 3 Spout Trial Sleeve
7136-1791	19mm L Cone 1 Spout Trial Sleeve
7136-1792	19mm L Cone 2 Spout Trial Sleeve
7136-1793	19mm L Cone 3 Spout Trial Sleeve
7136-1794	19mm XL Cone 1 Spout Trial Sleeve
7136-1795	19mm XL Cone 2 Spout Trial Sleeve
7136-1796	19mm XL Cone 3 Spout Trial Sleeve
7136-1797	21mm S Cone 1 Spout Trial Sleeve
7136-1798	21mm S Cone 2 Spout Trial Sleeve
7136-1799	21mm S Cone 3 Spout Trial Sleeve
7136-1801	21mm M Cone 1 Spout Trial Sleeve
7136-1802	21mm M Cone 2 Spout Trial Sleeve
7136-1803	21mm M Cone 3 Spout Trial Sleeve
7136-1804	21mm L Cone 1 Spout Trial Sleeve
7136-1805	21mm L Cone 2 Spout Trial Sleeve
7136-1806	21mm L Cone 3 Spout Trial Sleeve
7136-1807	21mm XL Cone 1 Spout Trial Sleeve
7136-1808	21mm XL Cone 2 Spout Trial Sleeve
7136-1809	21mm XL Cone 3 Spout Trial Sleeve
7136-1811	23mm S Cone 1 Spout Trial Sleeve
7136-1812	23mm S Cone 2 Spout Trial Sleeve
7136-1813	23mm S Cone 3 Spout Trial Sleeve
7136-1814	23mm M Cone 1 Spout Trial Sleeve
7136-1815	23mm M Cone 2 Spout Trial Sleeve
7136-1816	23mm M Cone 3 Spout Trial Sleeve
7136-1817	23mm L Cone 1 Spout Trial Sleeve
7136-1818	23mm L Cone 2 Spout Trial Sleeve
7136-1819	23mm L Cone 3 Spout Trial Sleeve
7136-1821	23mm XL Cone 1 Spout Trial Sleeve
7136-1822	23mm XL Cone 2 Spout Trial Sleeve
7136-1823	23mm XL Cone 3 Spout Trial Sleeve

EMPERION◇ Catalog Information – Instruments (continued)

Tall Trial Sleeve Extenders

Cat. no.	Description
7136-4266	11mm S Tall Trial Sleeve Extender
7136-4267	11mm M Tall Trial Sleeve Extender
7136-4268	13mm S Tall Trial Sleeve Extender
7136-4269	13mm M Tall Trial Sleeve Extender
7136-4270	15mm S Tall Trial Sleeve Extender
7136-4271	15mm M Tall Trial Sleeve Extender
7136-4272	17mm S Tall Trial Sleeve Extender
7136-4273	17mm M Tall Trial Sleeve Extender
7136-4274	19mm S Tall Trial Sleeve Extender
7136-4275	19mm M Tall Trial Sleeve Extender
7136-4276	21mm S Tall Trial Sleeve Extender
7136-4277	21mm M Tall Trial Sleeve Extender
7136-4280	23mm S Tall Trial Sleeve Extender
7136-4281	23mm M Tall Trial Sleeve Extender

Bowed Stem Trials

Cat. no.	Description
7136-4239	11mm Bowed Stem Trial
7136-4240	13mm Bowed Stem Trial
7136-4241	15mm Bowed Stem Trial
7136-4242	17mm Bowed Stem Trial
7136-4243	19mm Bowed Stem Trial
7136-1435	21mm Bowed Stem Trial
7136-1436	23mm Bowed Stem Trial

Bowed Stem Trial Sleeves

Cat. no.	Description
7136-1437	11mm M Bowed Trial Sleeve
7136-1438	13mm M Bowed Trial Sleeve
7136-1439	15mm M Bowed Trial Sleeve
7136-1440	17mm M Bowed Trial Sleeve
7136-1441	19mm M Bowed Trial Sleeve
7136-1444	11mm L Bowed Trial Sleeve
7136-1445	13mm L Bowed Trial Sleeve
7136-1446	15mm L Bowed Trial Sleeve
7136-1447	17mm L Bowed Trial Sleeve
7136-1448	19mm L Bowed Trial Sleeve
7136-1454	17mm XL Bowed Trial Sleeve
7136-1455	19mm XL Bowed Trial Sleeve
7136-1442	21mm M Bowed Trial Sleeve
7136-1443	23mm M Bowed Trial Sleeve
7136-1449	21mm L Bowed Trial Sleeve
7136-1450	23mm L Bowed Trial Sleeve
7136-1456	21mm XL Bowed Trial Sleeve
7136-1457	23mm XL Bowed Trial Sleeve

Sleeve Insertion Cones

Cat. no.	Description
7136-1266	9mm Insertion Cone
7136-1267	11mm Insertion Cone
7136-1268	13mm Insertion Cone
7136-1269	15mm Insertion Cone
7136-1270	17mm Insertion Cone
7136-1271	19mm Insertion Cone
7136-1272	21mm Insertion Cone
7136-1273	23mm Insertion Cone

Trial Heads

Cat. no.	Description
7136-9708	28mm -3 Trial Head
7136-9709	28mm +0 Trial Head
7136-9710	28mm +4 Trial Head
7136-9711	28mm +8 Trial Head
7136-9712	28mm +12 Trial Head
7136-9713	28mm +16 Trial Head
7136-9714	32mm -3 Trial Head
7136-9715	32mm +0 Trial Head
7136-9716	32mm +4 Trial Head
7136-9717	32mm +8 Trial Head
7136-9718	32mm +12 Trial Head
7136-9719	32mm +16 Trial Head
7136-9720	36mm -3 Trial Head
7136-9721	36mm +0 Trial Head
7136-9722	36mm +4 Trial Head
7136-9723	36mm +8 Trial Head
7136-9724	36mm +12 Trial Head

EMPERION◇ Catalog Information – Instruments (continued)

Miscellaneous Instruments

Cat. no.	Description
7136-0305	Sleeve Inserter Handle
7136-4037	Osteotomy Guide
7136-4006	Reamer T-Handle
7136-4036	Sleeve Implant Removal Tool
7136-4002	Box Osteotome – Small/Casting
7136-4001	Canal Finder
7136-4015	Trochanteric Reamer
7136-0917	Trial Removal Hook
7136-0919	Sleeve/Stem Separator
7136-0920	Trial Removal Handle
7136-4110	Trial Neck Inserter/Pilot Removal Tool
7163-1150	Slotted Hammer
7136-4012	Anteversion Handle
7136-4011	Stem Inserter Pommel
7136-4008	Stem Inserter Frame
7136-4009	Femoral Head Impactor

Trays

Cat. no.	Description
7112-9401	Single Height Case
7112-9400	Double Height Case
7112-9402	Case Lid
7136-4081	EMPERION Starter Tray
7136-4082	EMPERION Trial and Implant Instrument Tray
7136-4083	EMPERION Distal Reamer Tray
7136-4084	EMPERION Proximal Reamer Tray
7136-4085	EMPERION Milling Tray
7136-4086	EMPERION Size 9/11 & 13/15 Stem/Trial Tray
7136-4087	EMPERION Size 17/19 Stem/Trial Tray
7136-4088	EMPERION Revsion Instrument & Trial Tray
7136-4089	EMPERION Thin Shaft Reamer Tray
7136-4090	EMPERION Bowed Stem/Trial Tray
7136-4091	EMPERION Size 21/23 Tray 1
7136-4092	EMPERION Size 21/23 Tray 2
7136-4093	EMPERION Size 21/23 Tray 3
7136-4094	EMPERION Size 21/23 Tray 4

Indications

Indications for use of the EMPERION® Modular Hip System include individuals undergoing primary and revision surgery where other treatments or devices have failed in rehabilitating hips damaged as a result of trauma or noninflammatory degenerative joint disease (NIDJD) or any of its composite diagnoses of osteoarthritis, avascular necrosis, traumatic arthritis, slipped capital epiphysis, fused hip, fracture of the pelvis and diastrophic variant.

Modular hip components are also indicated for inflammatory degenerative joint disease including rheumatoid arthritis, arthritis secondary to a variety of diseases and anomalies and congenital dysplasia; old, remote osteomyelitis with an extended drainage-free period, in which case, the patient should be warned of an above normal danger of infection postoperatively; treatments of non-union, femoral neck fracture and trochanteric fractures of the proximal femur with head involvement that are unmanageable using other techniques; endoprosthesis, femoral osteotomy, or Girdlestone resection; fracture-dislocation of the hip; and correction of deformity.

Orthopaedic Reconstruction
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