

Arcos® One-piece Femoral Revision System

Surgical Technique





Figure 1

Introduction

The Arcos One-piece Femoral Revision System is a comprehensive, press-fit stem for reconstruction of various defects. The system is used with Biomet Type I Taper modular heads, compatible acetabular shells, liners and screws. Components are available in a variety of designs (Figure 1) and size ranges intended for uncemented primary and revision procedures.

Stem options:

- Broach (collared) body geometry available in 175 mm length
- Broach (non-collared) body geometry available in 210 mm stem length
- Calcar body geometry available in 210 mm stem length

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Refer to the package insert for a complete list of prescribing information, including indications, contraindications, warnings, precautions, potential adverse effects, and patient counseling information. This technique guide was developed in conjunction with health care professionals.



Figure 2



Figure 3

Preoperative Planning

When planning a hip revision utilizing the Arcos One-piece Femoral Revision System, carefully review the indications and contraindications for use referenced herein.

The Arcos System is not designed for use in a fully unsupported proximal femur. Bone stock of adequate quality must be present and appraised at the time of surgery.

Manual preoperative planning utilizing A/P and M/L X-rays and implant templates will assist in determining the correct implant size, offset and position for a stable reconstruction (Figure 2). Final determination frequently cannot be made until the actual time of surgery. However, a consistent operative plan, with alternatives, can be formulated with appropriate planning.

Digital Preoperative Planning

The Arcos One-piece Femoral Revision System digital templates are available through various digital template providers. When using digital templates, it is necessary to use a magnification marker with a known dimension to calibrate the PAC image.

Once the correct magnification has been determined, the digital templating system can be used to best decide the correct implant required to help restore the patient's anatomy.

Patient Positioning and Surgical Approach

The goal of the surgical approach is to establish adequate visualization of the anatomy (Figure 3).



Figure 4

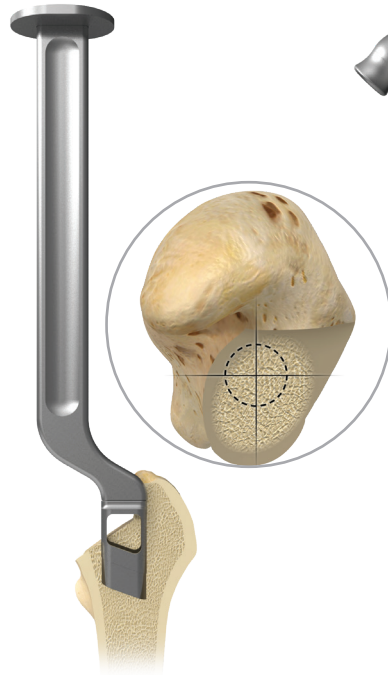


Figure 5



Figure 6

Primary Technique

Femoral Neck Resection

Once the femoral head has been dislocated from the acetabulum, the femoral neck can be resected. Using the Arcos One-piece Femoral Revision System templates, determine the height of the femoral neck resection above the lesser trochanter and the height of the tip of the greater trochanter relative to the shoulder of the femoral component (Figure 4). A resection guide may be used to mark the neck resection level, utilizing the greater trochanter as a reference point which corresponds to the measurements on the template. Resect the femoral neck at this level to recreate the appropriate femoral neck length and offset.

Accessing the Femoral Canal

A box chisel can be used to open the femoral canal. This helps to clear a channel laterally to accept the starter reamer without interference from the dense bone surrounding the trochanter. The offset chisel is designed to provide lateralization of the femoral canal to avoid varus positioning of the component (Figure 5).

A single starter reamer on a T-handle may be used to initiate the opening into the distal femoral canal to a level appropriate to the size component templated on the preoperative X-rays (Figure 6).



Figure 7



Figure 8



Figure 9

Revision Technique

Removal of a Cemented Component

Remove the primary stem from the cement mantle utilizing the universal extraction instruments or manufacturer specified instruments. Ensure all cement is removed prior to preparation of the femur for the Arcos One-piece femoral revision components (Figure 7). This can be achieved using a cement removal system or cement removal tools. An osteotomy of the femur may be necessary to facilitate removal of the cement.

Removal of a Cementless Stem

Removal of a cementless stem may be difficult due to the biologic fixation that may exist between the implant and bone. When removing a proximally porous coated stem, it may be necessary to perform an osteotomy of the femur, just below the level of the porous coating, to assist in stem removal (Figure 8).

ⓘ **Note:** An extended trochanteric osteotomy may be necessary if removing an extensively coated stem.

Sectioning the stem and utilizing trephine reamers can assist in the removal of the porous coated distal segment of a cementless stem (Figure 9).



Figure 10



Figure 11

Preparation of the Diaphysis

175 and 210 mm Length Stems

To prepare the femur for the 175 or 210 mm Arcos One-piece stem, select cylindrical reamers and sequentially ream in 0.5 mm increments. Ensure the reamer is two cortical diameters or 2-3 cm below the distal defect, increasing reamer diameter until cortical “chatter” is achieved.

The Arcos One-piece cylindrical reamers have color-coded circles that correspond to the 175 (orange) and 210 mm (purple) length stems. Align the appropriate color-coded circle on the reamer to the tip of the greater trochanter.

Note: The 210 mm Arcos One-piece stem features a relieved distal tip to allow proper anatomic fit within a bowed femoral canal. If templating indicates potential impingement of the anterior cortex, flexible reamers may be used in place of the cylindrical reamers to prepare the femoral canal (Figure 11).

The chart below provides guidance on final reamer diameter in relation to the implant size, but final determination is dependent on bone quality.

Stem Length	Reamer Diameter
175 mm	0.5 mm smaller than final implant size
210 mm	0.5 mm smaller or equal to final implant size

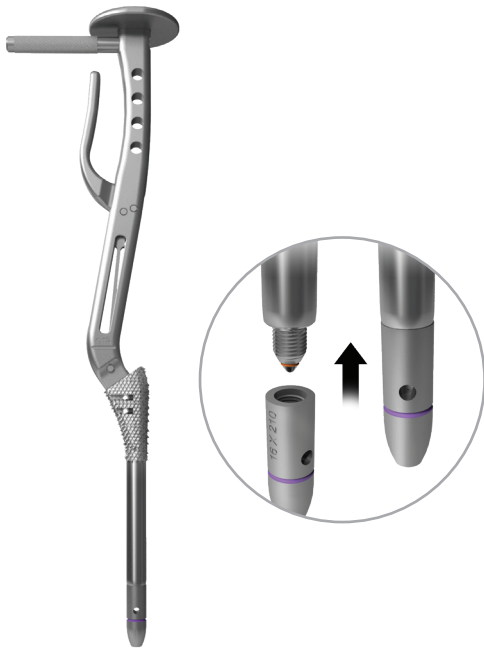


Figure 12



Figure 13

Broaching the Metaphysis

All Arcos One-piece broaches are 175 mm in length and are designed to accommodate a broach extension when preparing the femoral canal for a 210 mm length femoral implant.

- ⓘ **Note:** Stem sizes 9.5 and 11 mm are the same size in the proximal region of the stem and therefore utilize the same size 11 mm broach.
- ⓘ **Note:** The broach and broach extension are color-coded to correspond to the depth markings on the cylindrical reamers.

Broach Extension Assembly

Thread the extension to the tip of the corresponding size broach until the threads are fully engaged (Figure 12). The tapered geometry of the extension is designed to simulate the distal relief of the femoral implant. If needed, a 3.5 mm hex driver is available to assist with assembly.

Broach the proximal femur sequentially (Figure 13). The final broach size used should match the final implant size. Verify that the broach is advanced into the femur, oriented to the desired anteversion and the etch mark on the broach handle is aligned with the tip of the greater trochanter.

- ⓘ **Note:** A calcar planer is available for use with the 175 mm collared broach implant. Ensure that the plunger is fully seated over the broach post prior to advancing the body and blade of the planer.

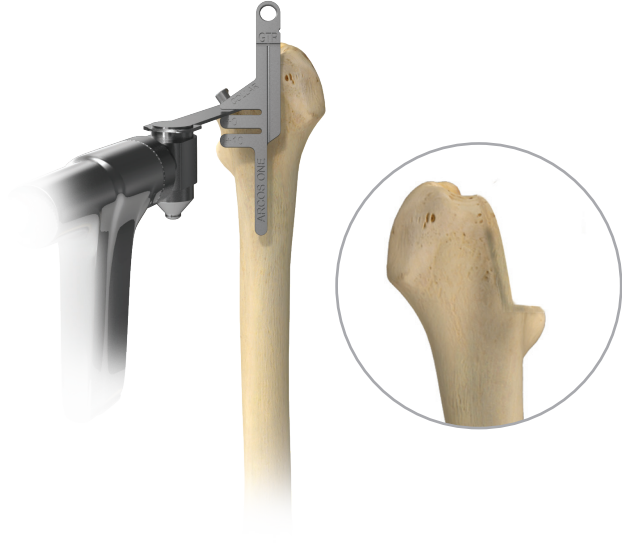


Figure 14

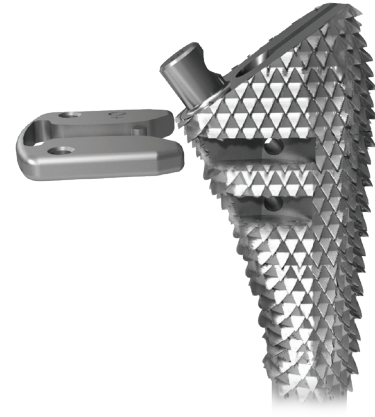


Figure 15

Calcar Resection

If utilizing the calcar proximal body implant, determine the level of deficiency in the proximal femur, align the resection guide to the broach and mark the +0 resection with a saw (Figure 14). Remove the broach with the broach handle and complete the calcar resection.

Insert the platform trial into the top slot of the broach. (Figure 15).

Reattach the broach handle to the trial and insert the trial into the femur to verify that it seats to the desired level.



Figure 16

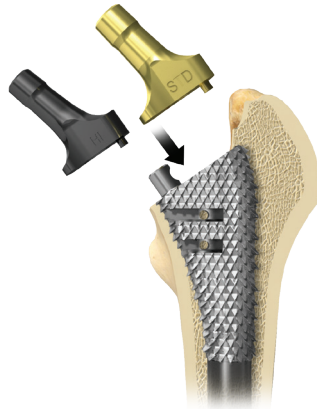


Figure 17

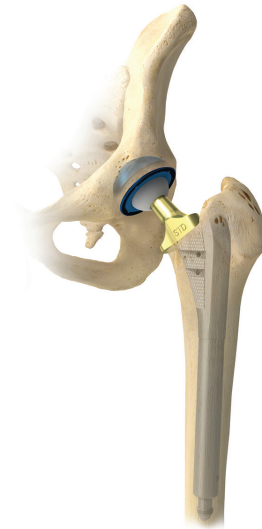


Figure 18

Trial Reduction

The neck trunnions are offered in standard (STD) and high (HI) offset. These trunnions are color-coded to represent offset. The gold trunnions represent standard offset while the black represents high offset.

Collared trials should be used for 175 mm length stems. Non-collared trials should be used for 210 mm length stems. The Arcos One-piece trunnions are sized to correspond to the final implant with the stem size and orientation clearly marked on the trunnion (Figure 16).

To perform a trial reduction with the seated broach, attach the neck trunnion onto the broach post (Figure 17).

Utilizing the modular neck and head trials, perform a trial reduction of the hip and determine if the offset, leg length and joint stability are appropriate (Figure 18). When performing the trial range of motion, ensure the absence of impingement of the neck on the rim of the acetabular component or acetabular liner.

Once the desired offset, leg length and joint stability have been achieved, remove the modular neck and head trials. Reattach the broach handle to the broach body and remove it from the femur.



Figure 19



Figure 20

Stem Insertion

Attach the implant to the threaded femoral stem inserter and insert it into the femoral canal. The femoral inserter handle assists in controlling rotation of the implant and enables the implant to be inserted into the femoral canal with the proper amount of anteversion.

Take care to orient the implant parallel to the prepared femoral canal, matching the appropriate amount of anteversion determined during the broaching step. When seating the final implant, the etch mark on the inserter handle should align with the tip of the greater trochanter or be advanced to the same position achieved during broaching.

Tap the stem inserter to seat the prosthesis (Figure 19). Remove the inserter when the implant is fully seated.

Final Reduction

If desired, another trial reduction can be performed prior to selecting final head size and impacting the modular head onto the stem. Provisional heads in seven neck lengths allow an additional trial reduction using the actual implant to achieve proper leg length and stability.

After seating fully the femoral component, position the modular head onto a dry and clean surface of the trunnion. Fully seat the modular head by means of firm axial impaction utilizing the femoral head driver and mallet. Once the definitive modular femoral head has been attached to the femoral stem, reduce the hip joint (Figure 20).



Figure 21

Component Removal

Should an Arcos One-piece stem ever require removal, utilize the universal stem removal instruments (Figure 21).

ⓘ **Note:** The same instrumentation can be used for the removal of a well fixed broach during femoral preparation.

Arcos One-piece Stem Offset Chart

Size		Horizontal Offset (mm)						Vertical Offset (mm)							
		-6	-3	STD	+3	+6	+9	+12	-6	-3	STD	+3	+6	+9	+12
9.5 mm*	Standard Offset	33	35	37	39	41	43	46	8	10	12	14	16	18	20
	High Offset	38	41	43	45	48	50	52	8	10	12	14	16	18	20
11 mm*	Standard Offset	33	35	37	39	41	43	46	8	10	12	14	16	18	20
	High Offset	38	41	43	45	48	50	52	8	10	12	14	16	18	20
12 mm	Standard Offset	33	35	37	39	42	44	46	8	10	12	14	16	18	20
	High Offset	39	41	43	46	48	50	53	8	10	12	14	16	18	20
13 mm	Standard Offset	33	36	38	40	42	44	46	8	10	12	14	16	18	20
	High Offset	39	41	44	46	48	51	53	8	10	12	14	16	18	20
14 mm	Standard Offset	34	37	38	40	42	44	46	8	10	12	14	16	18	20
	High Offset	39	42	44	46	49	51	53	8	10	12	14	16	18	20
15 mm	Standard Offset	36	38	40	42	44	46	48	8	10	12	14	16	18	20
	High Offset	41	44	46	48	51	53	55	8	10	12	14	16	18	20
16 mm	Standard Offset	36	38	40	42	44	47	49	8	10	12	14	16	18	20
	High Offset	42	44	46	49	51	53	55	8	10	12	14	16	18	20
18 mm	Standard Offset	37	39	41	43	45	47	49	8	10	12	14	16	18	20
	High Offset	42	45	47	49	51	54	56	8	10	12	14	16	18	20
20 mm	Standard Offset	39	41	43	45	47	50	52	9	11	13	15	17	19	21
	High Offset	45	47	49	51	54	56	58	9	11	13	15	17	19	21
22 mm	Standard Offset	39	42	44	46	48	50	52	9	11	13	15	17	19	21
	High Offset	45	47	50	52	54	57	59	9	11	13	15	17	19	21

* Stem sizes 9.5 and 11 mm are the same size in the proximal region of the stem.

The size 11 mm stem option is 1.5 mm larger in the distal region of the stem due to the PPS® coating.

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