Arcos Interlocking Distal Stem

Surgical Technique Addendum to the Arcos Modular Femoral Revision System

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When one surgeon connects with one patient to provide personalized care, the promise of medicine is fulfilled.

Arcos Modular Femoral Revision System

Cone Proximal Body & Interlocking Distal Stems

Ream-Over Technique

Figure 1

Figure 2

Overview

Arcos interlocking distal components have been designed to augment stem rotational stability in cases where primary fixation may be compromised due to sclerotic or deficient bone stock, or to stabilize a femoral fragment in cases of fracture when additional fixation is deemed necessary. The interlocking distal components can only be implanted using the ream-over surgical technique

Preparation of the Diaphysis

To prepare the femur for the interlocking distal stem, select flexible or thin shaft reamers and sequentially ream the femur two cortical diameters or 2-3 cm below the distal defect, increasing size until cortical 'chatter' is achieved (Figure 1). When utilizing the interlocking distal stem for cases where a fracture is evident and screw fixation is to be used, the most proximal of the distal fixation screw holes must be at least 2-3 cm below the fracture point (Figure 2).

Note: When utilizing flexible reamers, ream the canal in 0.5 mm increments until cortical 'chatter' is achieved. The final reamer diameter will depend on the length of press-fit/intact bone and the bone quality of the femur. The final reamer diameter may be .5 mm smaller than the diameter of the final implant in cases with poor bone quality and less press-fit length. Line-to-line or over-reaming may be necessary in cases with more press-fit/intact bone and better bone quality.

Note: Reaming over a guide is recommended. The Arcos distal reamers that are designed to prepare the femur for a bowed distal stem are cannulated to accommodate a guide wire.

The Arcos System was designed and developed in conjunction with Hugh Apthorp, FRCS, John Barrington, M.D., Keith R. Berend, M.D., J. Rod Davey, M.D., Edward McPherson, M.D., Christopher Peters, M.D., and Ian Stockley, FRCS. This Arcos Modular Femoral Revision System pre-operative planning and surgical technique is utilized by the surgeons listed above, Biomet, as the manufacturer of this device, does not practice medicine and does not recommend this device or technique. Each surgeon is responsible for determining the appropriate device and technique to utilize on each individual patient.

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Ream-Over Technique

Figure 3

Figure 4

Preparation of the Metaphysis: Part One

To prepare the femur for the flared region of the interlocking distal stem, select the transition reamer that is the same size as the desired distal stem and ream to the depth of the desired proximal body height (60, 70 or 80 mm). The etch mark of the transition reamer, that corresponds to the proximal body height selected, should align with the tip of the greater trochanter (Figure 3).

Note: The 50 mm, size A cone proximal body implant was not designed to accommodate a trochanteric bolt and claw. If a trochanteric bolt and claw is desired, utilize a cone proximal body implant with a 60, 70 or 80 mm vertical height.

Trialing the Distal Stem

When distal reaming is complete, select the stem trial that is the same diameter as the final transition reamer and the necessary length for stem stability. Thread the distal trial stem inserter into the stem trial and insert the stem trial into the femur, matching the etched depth mark on the inserter to the depth achieved from the transition reamer (Figure 4).

Note: The stem trial will be 1.5 mm smaller than the final implant diameter as measured over the porous coating.

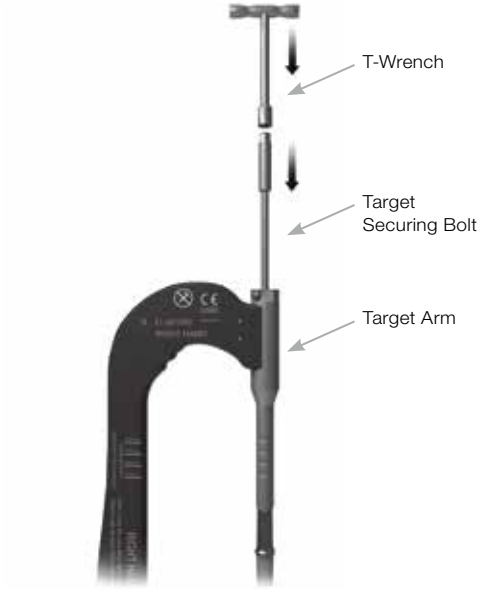


Figure 5

Figure 6

Figure 7

Distal Stem Insertion

Interlocking distal stems should be assembled to the distal targeting device prior to insertion into the femur. It is also recommended that prior to inserting the interlocking stem into the femur a pre-alignment check is carried out. To carry out this alignment check, first assemble the targeting arm as shown (Figures 5 & 6). Once the targeting device is secure, slide a guide tube and drill into the targeting device that aligns with the most distal hole in the implant (Figure 7). If the drill aligns with the hole, then proceed to the next stage of the operation.

Note: The Arcos distal targeting device is available in left and right versions. It is important to select the correct device prior to assembling to the interlocking distal stem.

Arcos Modular Femoral Revision System

Cone Proximal Body & Interlocking Distal Stems

Ream-Over Technique

Figure 8

Figure 9

Distal Stem Insertion (cont.)

Insert the assembled Interlocking distal stem/distal targeting device into the femur by gently tapping the impaction handle (Figure 8). When the stem has been inserted to the correct level, as determined by the femoral reaming and trial, make note of the reference mark on the alignment device that corresponds with the tip of the greater trochanter (Figure 9).

Figure 10

Figure 11

Distal Stem Retraction

Note: Should the stem need to be retracted, first twist the impaction handle until it locks onto the assembly (Figure 10). Then attach the slide hammer assembly as shown and utilize to retract the complete stem/distal targeting device assembly from the femur (Figure 11).

Cone Proximal Body & Interlocking Distal Stems

Ream-Over Technique

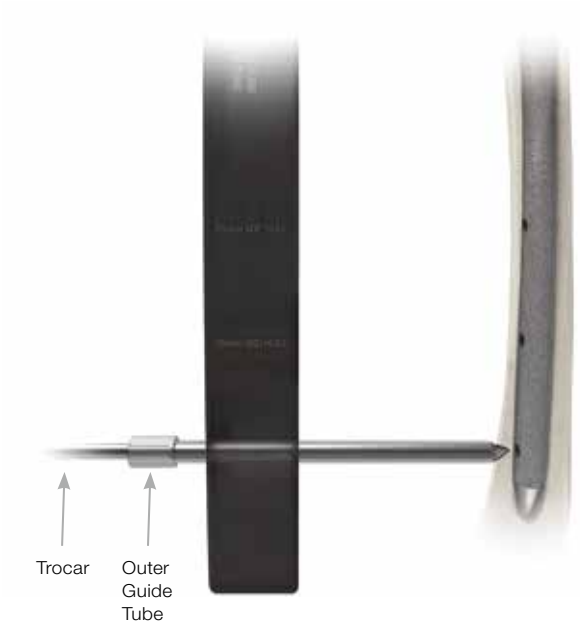


Figure 12

Figure 13

Transverse Locking Screw Preparation

Once the soft tissues have been resected in the appropriate manner, insert the outer guide tube and trocar through the holes in the distal targeting device. The trocar point is used to create an 'indent' in the lateral cortex (Figure 12). The trocar is then removed from the outer guide tube and replaced with a 5.1 mm twist drill. This drill is then used to perforate the lateral cortex. This drill contains a 'built-in' stop to prevent it from advancing any further than 20 mm (Figure 13).

Figure 14

Figure 15

Transverse Locking Screw Insertion

When drilling of the lateral cortex has been completed, insert the inner guide tube into the outer guide tube ensuring that it is fully seated against the lateral cortex (Figure 14). The 3.6 mm twist drill is then used to perforate the medial cortex (Figure 15).

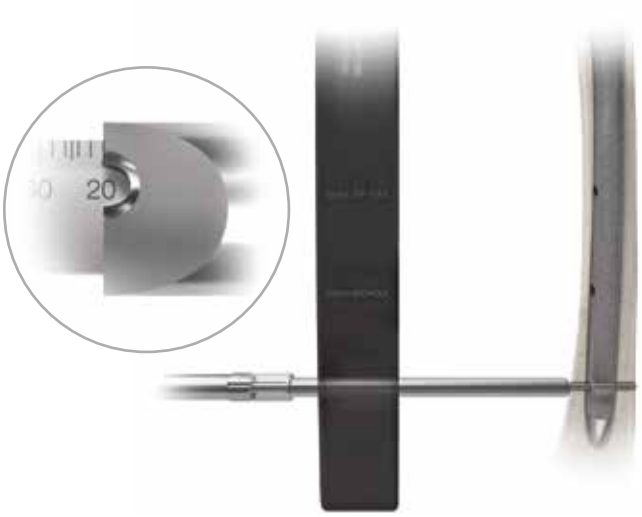


Figure 16

Figure 17

Transverse Locking Screw Insertion (cont.)

Remove the inner guide tube, insert the depth gauge into the outer guide tube and advance through both cortices. Use the depth gauge to determine the correct length of transverse fixation screws needed (Figure 16). Once selected, insert the screw into the outer guide tube and utilize the 3.5 mm T-handle hex driver to tighten the screw in position. The 3.5 mm T-handle hex driver contains a marker groove that highlights when the screw is fully seated (Figure 17). Repeat this step along the stem until each drilled hole has been secured with a screw.

Note: It is recommended that at least two screws are used.

Figure 18

Figure 19

Figure 20

Preparation of the Metaphysis: Part Two

Prior to reaming the proximal femur, first remove the distal targeting device assembly from the interlocking distal stem. Then, attach the reaming guide rod to the threaded hole in the proximal part of the distal stem (Figures 18 and 19).

Note: The reaming guide rod must be attached to the stem to properly ream-over the taper junction. The rod protects the taper junction from reamer damage and provides for accurate reaming depth.

Ream the proximal femur over the reaming guide rod with the proximal reamers until they no longer advance.

A green line is visible through the proximal reamer window verifying that the reamer is fully seated and the proper reaming depth is obtained. Sequentially increase the size of the reamers until the desired proximal body size (A–G) is achieved (Figure 20).

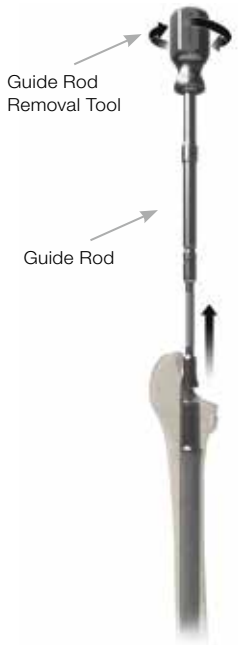


Figure 21

Figure 22

Preparation of the Metaphysis: Part Two (cont.)

Remove the guide rod from the distal stem implant with the guide rod removal tool, turning the removal tool counter-clockwise (Figure 21).

Trialing the Proximal Body

To trial the proximal body, first ensure that the taper junction on the distal stem implant is clean and dry. Attach the cone trial that is the same height and size as the final proximal reamer and the appropriate offset. The light green trial indicates standard offset and the purple trial represents high offset. Assemble the 3.5 mm hex driver to the T-handle and adjust the T-handle to the torque limiting position. Tighten the cone trial to the distal stem implant until the T-handle “clicks,” setting the desired anteversion or retroversion in the proximal body (Figure 22).

Note: The anti-rotation handle can be placed over the neck of the trial to control anteversion or retroversion. Once the desired version has been achieved, use electrocautery to mark the desired position under the neck on the remaining bone stock.

Note: In cases with good medial bone stock, impingement between the medial neck and bone may occur causing the trial to not properly seat. Using the appropriate hand tools such as a rongeur, remove the excess bone and re-seat the trial before choosing a final implant.

Figure 23

Trial Reduction

Utilizing modular head trials, perform a trial reduction and determine if the selected offset, leg length and joint stability are appropriate (Figure 23). In performing the trial range of motion, ensure the absence of impingement of the neck on the rim of the acetabular component or acetabular liner. Remove the cone trial from the femur with the 3.5 mm hex driver.

Taper Compression Assembly

Figure 24

Figure 25

Figure 26

Proximal Body Insertion

Attaching the Proximal Body to the Distal Stem Implant

Once the desired offset has been chosen, ensure that the taper junction on the distal stem implant is clean and dry. Attach the proximal fastener to the cone proximal body implant by threading the proximal fastener into the insertion hole on the cone proximal body implant (Figure 24). Place the gray proximal/distal inserter handle over the proximal fastener by pulling back on the inserter collar and locking the proximal body, ensuring the anti-rotation tabs are locked to the proximal body implant (Figure 25).

Place the distal fastener that matches the selected proximal body height into the proximal/distal inserter handle. Depress the button at the end of the proximal/distal inserter handle and insert the distal fastener into the inserter (Figure 26).

Figure 27

Figure 28

Figure 29

Insert the 5.0 mm hex driver into the top of the proximal/distal inserter handle and tightly thread the distal fastener into the distal stem (Figure 27). Attach the proximal/distal inserter handle strike plate, tightening until a “click” is felt and heard.

Set the desired version of the cone proximal body implant by turning the strike plate clockwise until it stops (Figure 28).

To fully engage the implant taper junction, attach the torque wrench to the end of the proximal/distal inserter handle strike plate, place the anti-rotation handle to the implant neck and tighten until 300 in-lbs (33.89 Nm) is indicated on the torque wrench shaft (Figure 29).

Taper Compression Assembly

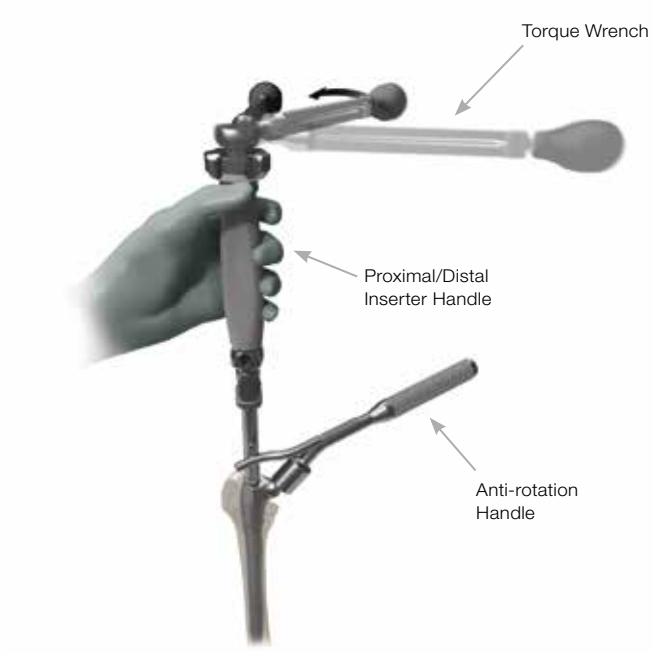


Figure 30

Figure 31

Inserter Disassembly

To remove the inserter from the fully seated implant, turn the torque wrench counter-clockwise while leveraging the anti-rotation handle, depress the button at the top of the proximal/distal inserter handle and unthread the strike plate (Figure 30). Unthread the distal fastener from the distal stem implant using the 5.0 mm hex driver (Figure 31).

Note: If the distal fastener is difficult to loosen with the 5.0 mm hex driver, attach the T-handle, set to the OFF position, and turn it counter-clockwise.

Figure 32

Figure 33

Torque Limiting Position

Figure 34

Disengage the proximal/distal inserter by pulling back on the inserter collar (Figure 32). To remove the proximal fastener, utilize the taper assembly driver and unthread the proximal fastener from the proximal body implant (Figure 33).

Note: This inserter disassembly technique will NOT disassemble the implant.

Inserting the Locking Screw

To lock the distal and proximal body implants, thread the locking screw into the top of the proximal body using the 3.5 mm hex driver and T-handle in torque limiting position until a “click” is felt and heard (Figure 34).

Note: If the screw does not thread into the distal stem, the proximal body is not fully seated and the final implant assembly steps must be repeated.

Figure 35

Final Reduction

If desired, another trial reduction can be accomplished prior to selecting final head size and impacting the modular head onto the stem (Figure 35). Provisional heads in seven neck lengths allow an additional trial reduction, using the actual implant to ensure proper leg length and stability. After fully seating the femoral component, impact the appropriate modular head onto the clean, dry taper.

Arcos Modular Femoral Revision System

Product	Part Number	Description	Diameter	Length
	**11-301815**	Interlocking Distal PPS Distal Stem	15 mm	200 mm
	11-301816	Interlocking Distal PPS Distal Stem	16 mm	200 mm
	11-301817	Interlocking Distal PPS Distal Stem	17 mm	200 mm
	11-301818	Interlocking Distal PPS Distal Stem	18 mm	200 mm
	11-301819	Interlocking Distal PPS Distal Stem	19 mm	200 mm
	11-301820	Interlocking Distal PPS Distal Stem	20 mm	200 mm
	11-301821	Interlocking Distal PPS Distal Stem	21 mm	200 mm
	11-301822	Interlocking Distal PPS Distal Stem	22 mm	200 mm
	11-301823	Interlocking Distal PPS Distal Stem	23 mm	200 mm
	11-301824	Interlocking Distal PPS Distal Stem	24 mm	200 mm
	11-301825	Interlocking Distal PPS Distal Stem	25 mm	200 mm
	11-301826	Interlocking Distal PPS Distal Stem	26 mm	200 mm
	11-301915	Interlocking Distal PPS Distal Stem	15 mm	250 mm
	11-301916	Interlocking Distal PPS Distal Stem	16 mm	250 mm
	11-301917	Interlocking Distal PPS Distal Stem	17 mm	250 mm
	11-301918	Interlocking Distal PPS Distal Stem	18 mm	250 mm
	11-301919	Interlocking Distal PPS Distal Stem	19 mm	250 mm
	11-301920	Interlocking Distal PPS Distal Stem	20 mm	250 mm
	11-301921	Interlocking Distal PPS Distal Stem	21 mm	250 mm
	11-301922	Interlocking Distal PPS Distal Stem	22 mm	250 mm
	11-301923	Interlocking Distal PPS Distal Stem	23 mm	250 mm
	11-301924	Interlocking Distal PPS Distal Stem	24 mm	250 mm
	11-301925	Interlocking Distal PPS Distal Stem	25 mm	250 mm
	11-301926	Interlocking Distal PPS Distal Stem	26 mm	250 mm
	11-302015	Interlocking Distal PPS Distal Stem	15 mm	300 mm
	11-302016	Interlocking Distal PPS Distal Stem	16 mm	300 mm
	11-302017	Interlocking Distal PPS Distal Stem	17 mm	300 mm
	11-302018	Interlocking Distal PPS Distal Stem	18 mm	300 mm
	11-302019	Interlocking Distal PPS Distal Stem	19 mm	300 mm
	11-302020	Interlocking Distal PPS Distal Stem	20 mm	300 mm
	11-302021	Interlocking Distal PPS Distal Stem	21 mm	300 mm
	11-302022	Interlocking Distal PPS Distal Stem	22 mm	300 mm
	11-302023	Interlocking Distal PPS Distal Stem	23 mm	300 mm
	11-302024	Interlocking Distal PPS Distal Stem	24 mm	300 mm
	11-302025	Interlocking Distal PPS Distal Stem	25 mm	300 mm
	11-302026	Interlocking Distal PPS Distal Stem	26 mm	300 mm
	**CP250310**	Transverse Fixation Screw	5.0 mm	25 mm
	CP250311	Transverse Fixation Screw	5.0 mm	30 mm
	CP250312	Transverse Fixation Screw	5.0 mm	35 mm
	CP250313	Transverse Fixation Screw	5.0 mm	40 mm
	CP250314	Transverse Fixation Screw	5.0 mm	45 mm
	CP250315	Transverse Fixation Screw	5.0 mm	50 mm
	CP250316	Transverse Fixation Screw	5.0 mm	55 mm
	CP250317	Transverse Fixation Screw	5.0 mm	60 mm

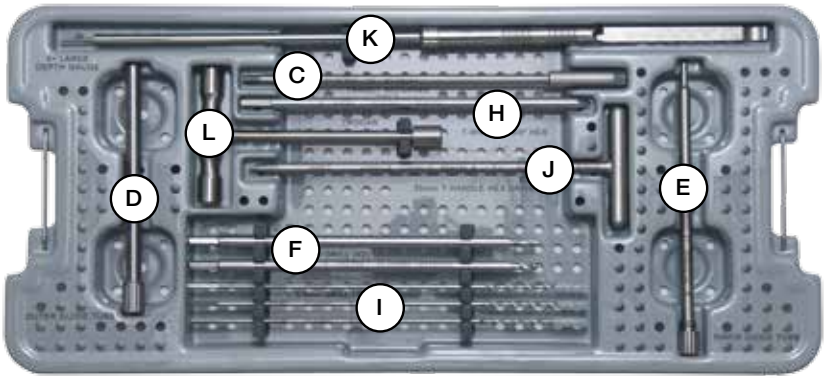
Arcos Modular Femoral Revision System

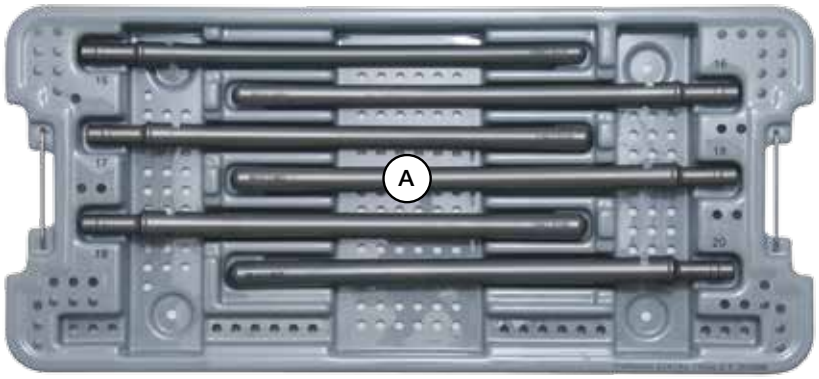
593107 Interlocking Distal Stem Instrument Tray

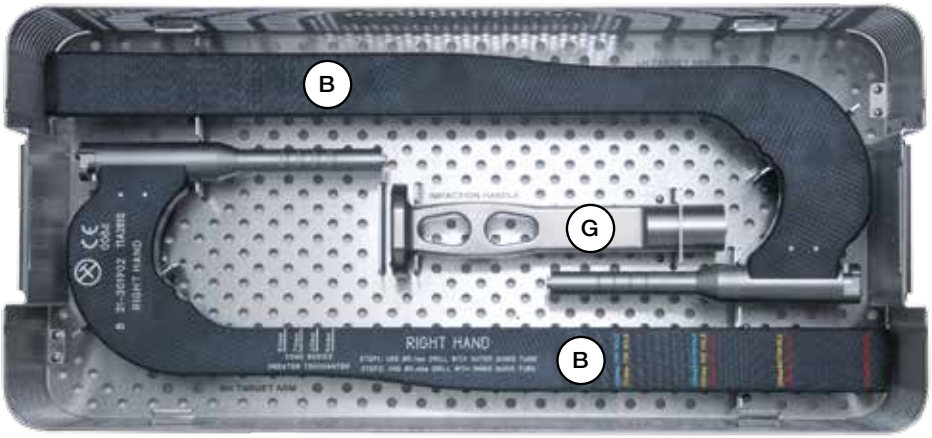
Product	Label	Part Number	Description	Size
	A	31-302015 31-302016 31-302017 31-302018 31-302019 31-302020 31-302021* 31-302022* 31-302023* 31-302024* 31-302025* 31-302026*	Porous Distal Trial 300 mm	15 mm x 300 mm 16 mm x 300 mm 17 mm x 300 mm 18 mm x 300 mm 19 mm x 300 mm 20 mm x 300 mm
	B	31-301901 31-301902	Target Arm	LH RH
	C	31-301910	Target Securing Bolt	-
	D	31-301911	Outer Guide Tube	-
	E	31-301912	Inner Guide Tube	-
	F	31-301913	5.1 mm Drill	-
	G	31-301918	Impaction Handle	-
	H	31-301919	Trocar	-
	I	31-301920	3.6 mm Drill	-
	J	31-301921	3.5 mm T-handle Hex Driver	-
	K	35-000099	5+ Large Depth Gauge	-
	L	449110	“T” Wrench 3/8 Hex	-

* 21–26 mm distal trials are in the macro instrument sets and available through the Biomet Loaner Department.

593107 Interlocking Distal Stem Instrument Tray







Notes

Biomet does not practice medicine. The treating surgeon is responsible for determining the appropriate treatment, (techniques), product(s) for each individual patient.

For complete product information regarding indications, contraindications, precautions, warnings and sterilization, see the instructions for use packaged with the device and visit www.biomet.com..

Please check for local product clearances and reference product specific instructions for use.

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Legal Manufacturer
Biomet Orthopedics
56 East Bell Drive
P.O. Box 587
Warsaw, Indiana 46581
USA

www.biomet.com

EC REP **European Representative**
Biomet UK Ltd.
Waterton Industrial Estate
Bridgend, South Wales
CF31 3XA
UK

CE 0086

Note: Biomet UK Ltd is the legal manufacturer for the Arcos distal instruments contained within this surgical technique www.biomet.com