Surgical Technique

smith&nephew

CPCS◇

Cemented Hip System

CPCS◇ Collarless Polished Cemented Stem

Surgical technique completed
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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.

Stem Specifications

Specifications					
Size	**Neck Angle**	**Distal Cross Section**	**Stem Length**	**A-P Width**	**M-L Width**
0, 0H	131°/125°	4.5mm	120mm	11mm	26mm
1, 1H	131°/125°	4.5mm	135mm	12mm	26mm
2, 2H	131°/125°	4.5mm	135mm	13mm	28mm
3, 3H	131°/125°	4.5mm	135mm	15mm	30mm
4, 4H	131°/125°	4.5mm	135mm	16mm	32mm
5, 5H	131°/125°	4.5mm	135mm	17mm	34mm

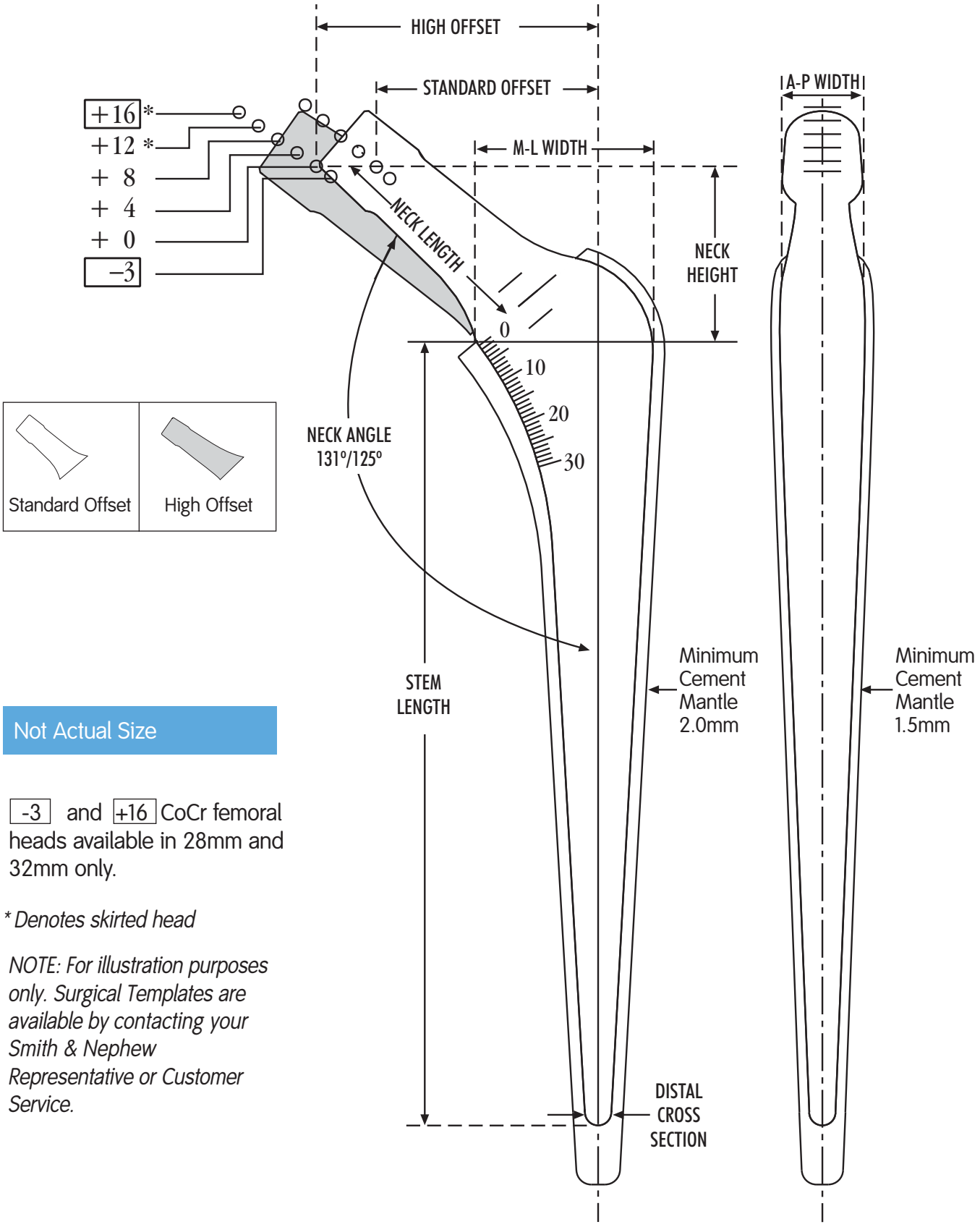
Neck Height mm						
	When Femoral Head Component Selected Is:					
Size	**–3**	**+0**	**+4**	**+8**	**+12**	**+16**
0	23	25	27	30	33	35
0H	23	25	27	30	32	34
1	24	26	28	31	34	36
1H	24	26	28	31	33	35
2	26	28	30	33	36	38
2H	26	28	30	33	35	37
3	28	30	32	35	37	40
3H	28	30	32	35	37	39
4	30	32	34	37	39	42
4H	30	32	34	36	39	41
5	32	34	36	39	41	44
5H	32	34	36	39	41	43

Neck Offset mm						
	When Femoral Head Component Selected Is:					
Size	**–3**	**+0**	**+4**	**+8**	**+12**	**+16**
0	31	33	36	39	42	45
0H	35	37	40	44	47	50
1	32	35	38	41	44	47
1H	39	41	44	48	51	54
2	34	36	39	42	45	48
2H	42	44	47	51	54	57
3	35	38	41	44	47	50
3H	46	48	51	55	58	61
4	37	39	42	45	48	51
4H	46	49	52	56	59	62
5	38	41	44	47	50	53
5H	49	51	54	58	61	64

Neck Length mm						
	When Femoral Head Component Selected Is:					
Size	**–3**	**+0**	**+4**	**+8**	**+12**	**+16**
0	25	28	32	36	40	44
0H	29	32	36	40	44	48
1	27	30	34	38	42	46
1H	32	35	39	43	47	51
2	29	32	36	40	44	48
2H	35	38	41	45	49	53
3	31	34	38	42	46	50
3H	39	42	46	50	54	58
4	33	36	40	44	48	52
4H	41	44	48	52	56	60
5	35	38	42	46	50	54
5H	43	46	50	54	58	62

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

Preparation of the Acetabulum



Not Actual Size

-3 and +16 CoCr femoral heads available in 28mm and 32mm only.

** Denotes skirted head*

NOTE: For illustration purposes only. Surgical Templates are available by contacting your Smith & Nephew Representative or Customer Service.

Femoral Osteotomy

1. **Femoral Osteotomy**

The level of neck resection should be based on preoperative templating. Place the template over the X-ray of the hip. After determining the appropriate size stem, determine the level of femoral neck resection based on the lesser trochanter as a landmark.

A graduation scale can be found on the medial aspect of the stem on the template. This scale corresponds to the marks on the osteotomy guide. Make note of how many graduations above the lesser trochanter the osteotomy will take place, as determined by the middle depth mark on the medial aspect of the stem (also identified as the zero mark on the graduation scale).

In the OR, place the osteotomy guide on the femur by referencing the lesser trochanter at the same graduation mark as noted during templating. Osteotomize the neck *(Figures 1 and 2)*.

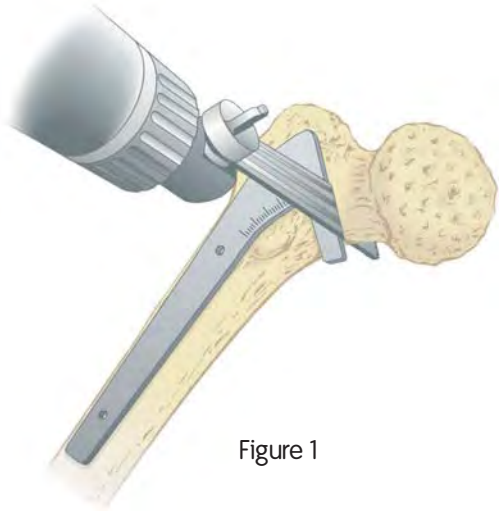


Figure 1

2. **Prepare Acetabulum**

If acetabular reconstruction is required, prepare the acetabulum using the technique for the intended acetabular component.

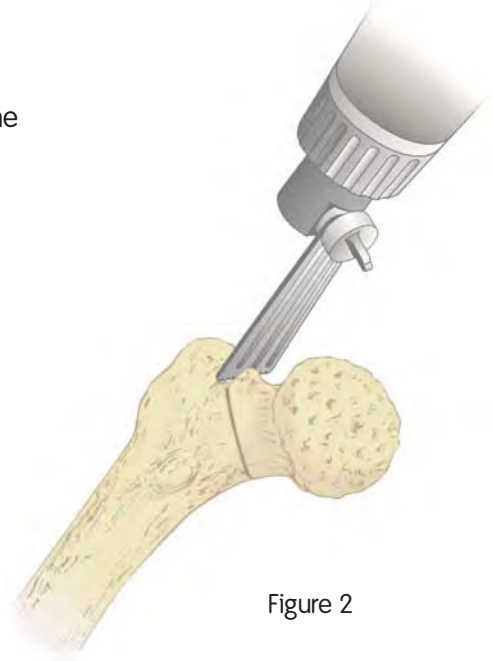


Figure 2

Femoral Canal Preparation

3. Femoral Canal Preparation

Open the medullary canal at the transected neck using the box chisel. Stay posterior and lateral in order to obtain a neutral stem position *(Figure 3)*. Identify and open the femoral canal using the blunt medullary reamer *(Figure 4)*.

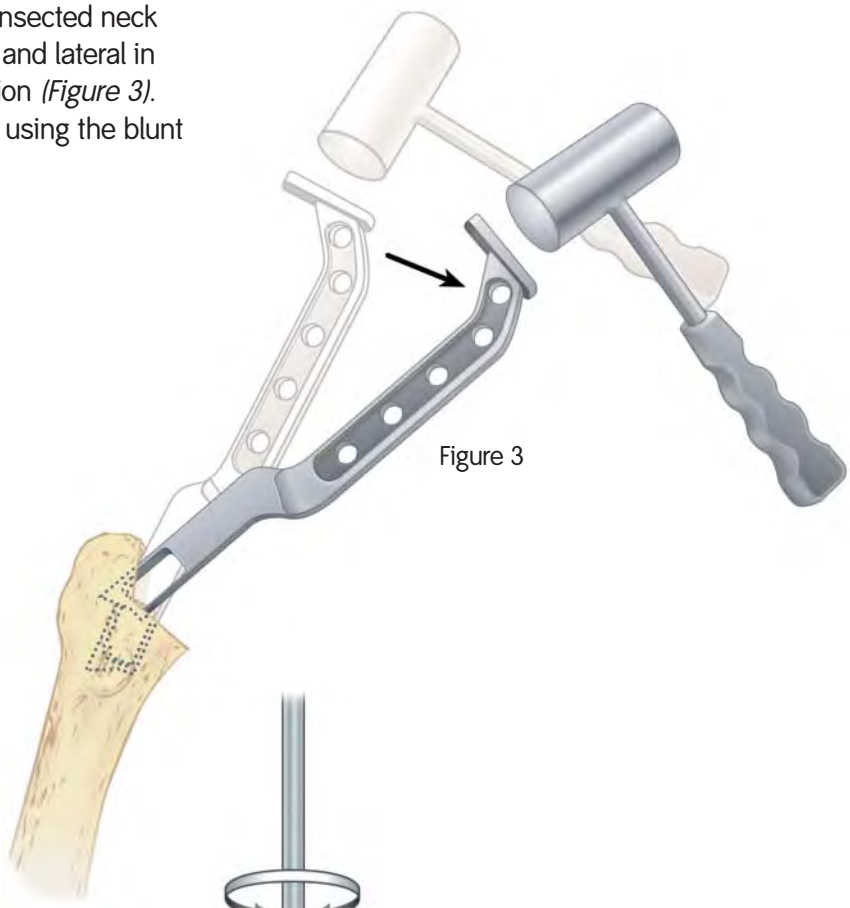


Figure 3

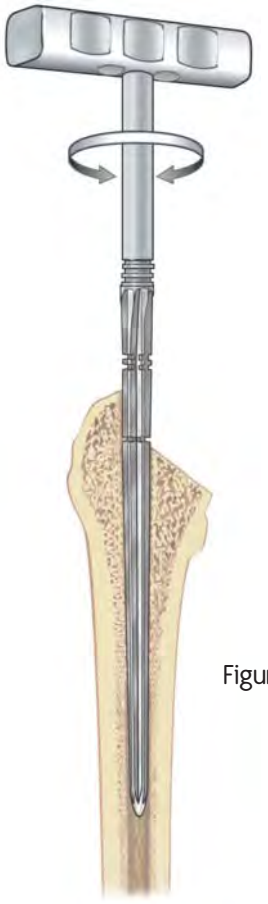


Figure 4

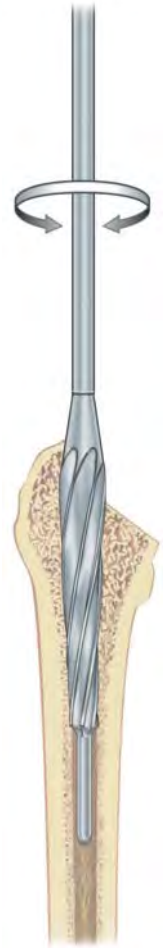


Figure 5

The trochanteric reamer is available to help ensure a lateral start point and open the metaphysis *(Figure 5)*.

4. Femoral Broaching

Assemble the broach to the broach handle by placing the broach post in the clamp. Use the thumb to lock the clamp onto the broach. A modular anteversion handle can be assembled to the broach handle to provide version control *(Figure 6)*.

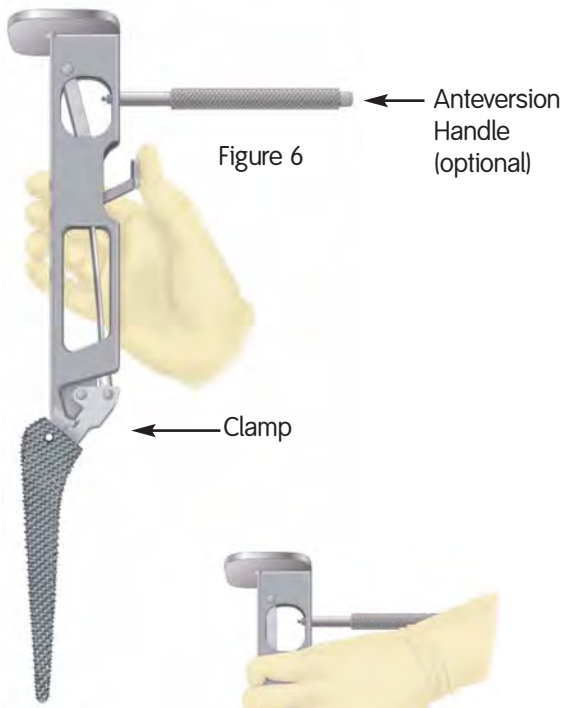


Figure 6

Start the broaching procedure along the mid-axis of the femur with the starter broach and progressively broach to the appropriate femoral stem size. Seat the final broach slightly below the level of the femoral neck resection to facilitate calcar reaming if desired *(Figure 7)*.

The CPCS broach is designed to provide a minimum 2.0mm cement mantle per side, medially and laterally, and 1.5mm per side, anteriorly and posteriorly. Additional cement mantle thickness is achieved by pressurizing the cement into the cancellous bone. The broach is 10mm longer than the corresponding implant to accommodate the distal centralizer.

Disassemble the broach from the broach handle by placing two fingers (index and middle) in the rectangular slot. Apply pressure to the release bar by squeezing two fingers toward the thumb resting on the medial side of the broach handle *(Figure 8)*.


Figure 8

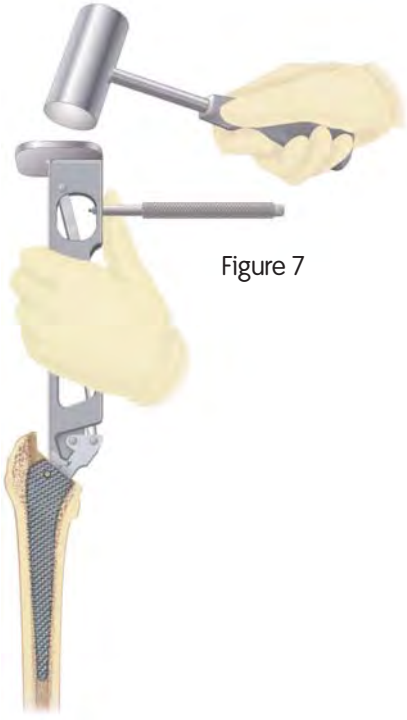
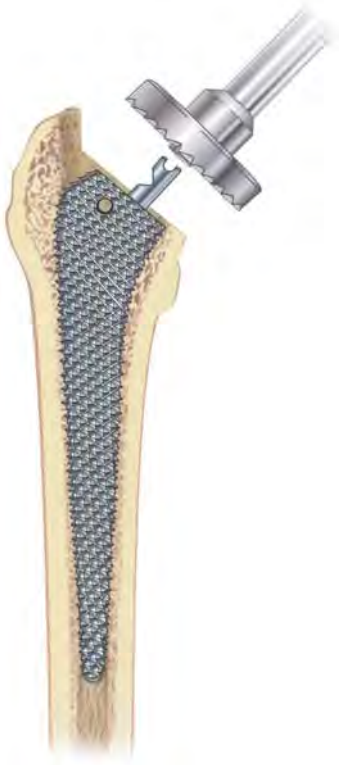


Figure 7

Calcar Preparation & Trialing



5. Calcar Preparation (optional)

If the femoral neck resection is asymmetric, with the broach fully seated, remove the broach handle and ream the calcar.
Plane the calcar until it is level with the broach.

6. Trialing

Remove the calcar reamer and place the matching standard or high offset trial neck (as determined by templating) onto the broach post. Select the trial femoral head of desired diameter and length. Reduce the hip to assess stability and to restore leg length. In some cases soft tissue tension may be improved by using the high offset trial neck instead of the standard offset trial neck.

The CPCS hip system was designed to allow the last broach seated in the femur to dictate the size implant to be used.

Femoral Head And Neck Length Options				
Trial Color	**22mm**	**26mm**	**28mm**	**32mm**
Green	—	—	–3	–3
Yellow	+0	+0	+0	+0
Red	+4	+4	+4	+4
White	+8	+8	+8	+8
Blue	+12*	+12*	+12*	+12*
Black	—	—	+16*	+16*

**Denotes skirted heads.*

Sizing the Femoral Canal

7. Sizing the Femoral Canal

Attach the broach handle to the broach and remove the broach from the femoral canal.

Using femoral canal sounds, determine the canal diameter to select the appropriately sized distal centralizer and cement restictor *(Figure 9)*.

A distal centralizer, ensures neutral stem alignment, and, if necessary, allows for slight subsidence of the stem by preventing the stem from becoming end-bearing in the cement. Neutral stem alignment provides a minimum 2.0mm cement mantle per side, medially and laterally, and 1.5mm cement mantle per side, anteriorly and posteriorly. Additional cement mantle thickness can be achieved by cement pressurization and the ensuing cement interdigitation.

Centralizers in 2mm increments are available in sizes 8-18mm. Any size centralizer fits on any size stem.

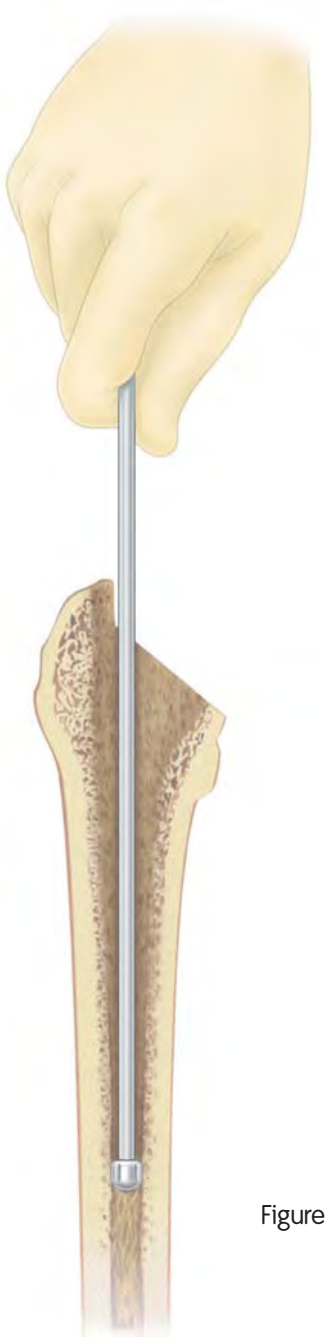


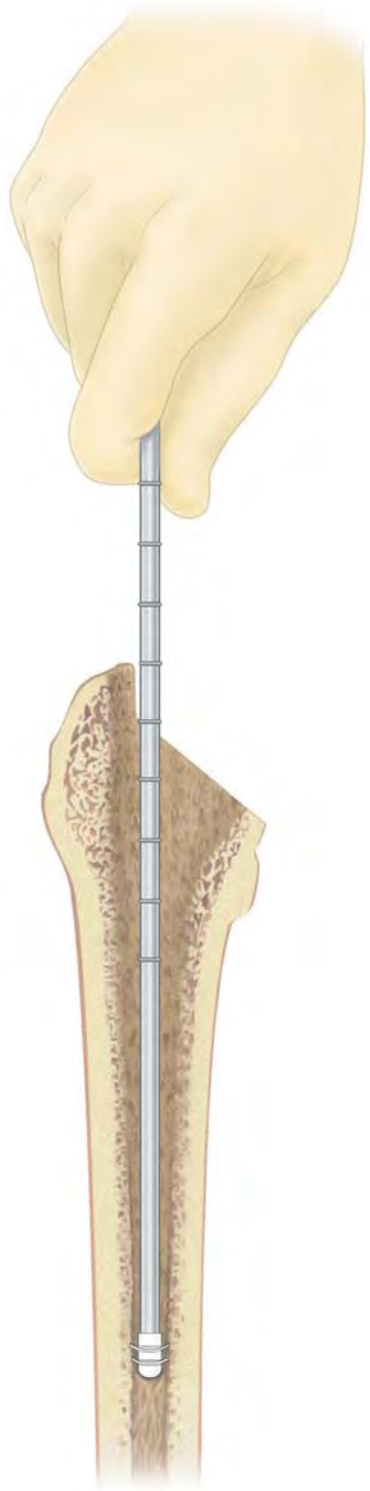
Figure 9

Placing the BUCK◇ Cement Restrictor

8. Placing the BUCK Cement Restrictor

The proximal flange of the cement restrictor should always be larger than the distal canal diameter. Accurate cement restrictor depth placement is then determined by placing the CPCS stem (with attached centralizer) next to the inserter tool and adding 20mm to the length (see chart below).

Thread the cement restrictor onto the inserter using a clockwise motion. Insert the device to the level of the medullary canal that has been predetermined. Once this level is reached, disengage the restrictor from the inserter using a counterclockwise twisting motion. Remove the inserter from the medullary canal. If it is necessary to remove the restrictor prior to cement insertion, it can be reattached to the inserter rod and pulled out of the canal. The surgeon may adjust the restrictor as many times as required.



Size	Depth
0	140mm
1	160mm
2	160mm
3	160mm
4	160mm
5	160mm

BUCK Plug Size	Canal Size	Catalog Number
18.5mm	<15mm	129418
25mm	16-21mm	129419
30mm	22-26mm	7127-9420
35mm	27-31mm	7127-9421

Preparing the Femoral Canal

9. Preparing The Femoral Canal

Irrigate the canal with saline solution and pulsatile lavage to remove all debris. Continue preparing the femur with the femoral canal brush to remove any remaining weak cancellous bone, blood clots, and marrow fats. Repeat lavaging as necessary to remove all remaining debris.

10. Drying The Femoral Canal

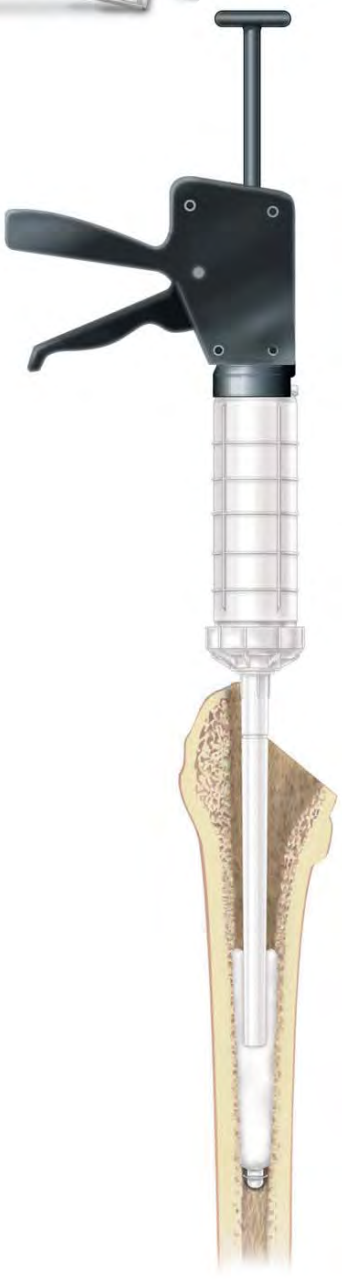
Insert the canal suction absorber into the femoral canal to dry the canal while mixing the cement.

11. Loading Cement

Load VERSABOND® bone cement into the VORTEX® vacuum mixer.

12. Mixing

Mix the cement according to manufacturer's instructions. Turn handle clockwise to achieve optimal homogenous mixture.



13. Injecting Cement

Remove the femoral canal suction absorber and use pulsatile lavage and dry. The cement should be introduced promptly to minimize bleeding into the canal. Insert the nozzle of the cement gun to the top of the Buck cement restrictor and inject cement into the canal in retrograde fashion. Continue injecting cement until the canal is completely full and the distal tip of the nozzle is clear of the canal.

Pressurizing Cement

14. Pressurizing Cement

Break off the long nozzle and place the femoral pressurizer over the short nozzle. Apply the disposable femoral pressurizer into the mouth of the canal. This will occlude the canal and compress the cement. Maintain firm pressure until the cement is in a doughy state and can withstand displacement and will allow for proper cement interdigitation into trabecular bone. Withdraw the femoral pressurizer and remove any extruded cement around the periphery of the canal.

Stem Insertion

15. Stem Insertion

Using clean gloves, place the distal centralizer over the distal tip of the stem by carefully pushing the centralizer superiorly until snug.

Attach the CPCS stem driver handle to the stem driver. The handle can be attached in two positions, horizontal or vertical depending on surgeon preference *(Figure 10)*. A button must to be pushed at the end of the handle to either engage or disengage the handle.

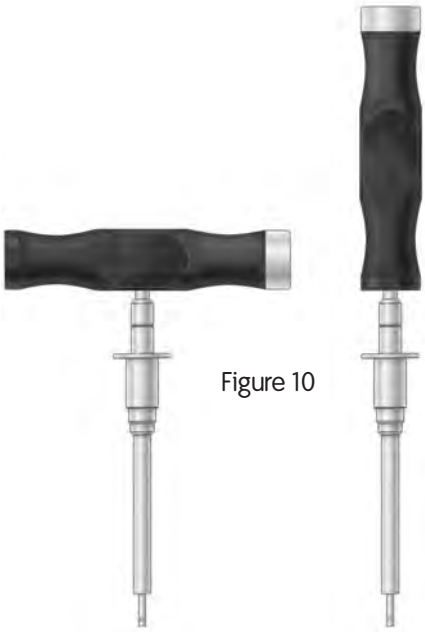


Figure 10

Insert the selected femoral stem into the canal by fitting the tip of the locking stem driver into the stem driving platform *(Figure 11)*. The circular disc on the stem driver must be pulled superiorly to engage the tip of the stem driver to the stem driving platform.

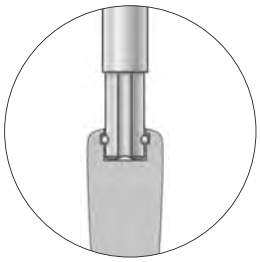


Figure 11

While pushing the stem into the canal, place the thumb medial to the stem in order to pressurize the cement and ensure correct alignment *(Figure 12)*. Advance the stem approximately 1cm per second to avoid air inclusions in the stem/cement interface. The stem should be inserted to the appropriate medial depth mark as determined during trial reduction and templating.

Trim away excess cement with Concise cement sculps. Carefully remove the stem driver by pulling the circular disc on the stem driver superiorly. Maintain steady pressure with the thumb on the neck taper until the cement is polymerized.

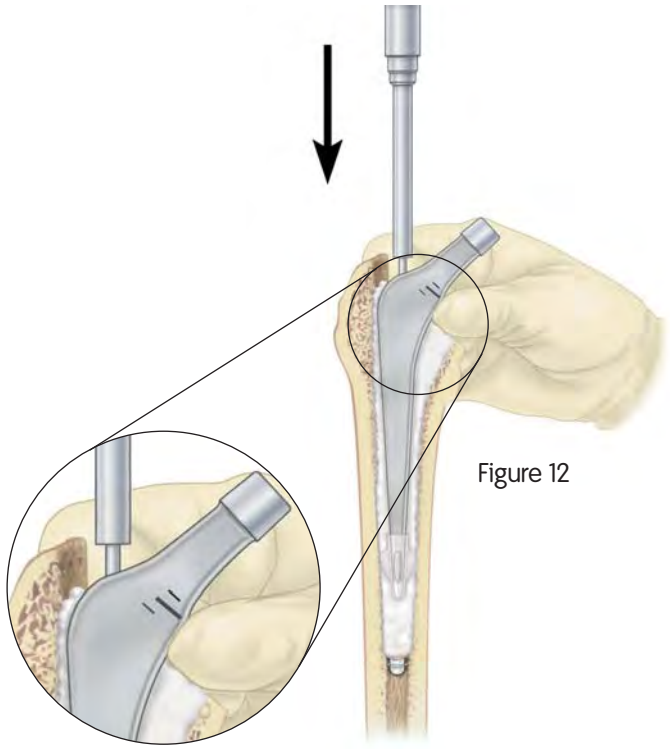


Figure 12

Final Trial Reduction

16. Final Trial Reduction

A final trial reduction may be performed at this time using trial femoral heads.

17. Femoral Head Assembly

Clean and dry the neck taper with a clean cloth. Place the prosthetic femoral head on the neck taper and firmly impact with a head impactor and a mallet.

NOTE: Care should be taken not to use Cobalt-Chromium heads on stainless steel stems. To distinguish the material, the stainless steel femoral heads have an indention at their taper opening, while the stainless steel stems have an indention in the middle of the taper.

Catalog Information - Femoral Stem & Head Components

CPCS◇
Primary Standard Offset Stems
Forged Cobalt Chromium – ASTM F 799

Size	Stem Length	Implant Cat. No.	Broach/Trial Cat. No.	Trial Neck Cat. No.
0	120mm	7131-2360	7136-3499	7136-2700
1	135mm	7131-2361	7136-3501	7136-2701
2	135mm	7131-2362	7136-3502	7136-2701
3	135mm	7131-2363	7136-3503	7136-2702
4	135mm	7131-2364	7136-3504	7136-2702
5	135mm	7131-2365	7136-3505	7136-2702

CPCS
Primary Standard Offset Stems
Stainless Steel – ASTM F 1586

Size	Stem Length	Implant Cat. No.	Broach/Trial Cat. No.	Trial Neck Cat. No.
0	120mm	7131-2380	7136-3499	7136-2700
1	135mm	7131-2381	7136-3501	7136-2701
2	135mm	7131-2382	7136-3502	7136-2701
3	135mm	7131-2383	7136-3503	7136-2702
4	135mm	7131-2384	7136-3504	7136-2702
5	135mm	7131-2385	7136-3505	7136-2702

CPCS
Primary High Offset Stems
Forged Cobalt Chromium – ASTM F 799

Size	Stem Length	Implant Cat. No.	Broach/Trial Cat. No.	Trial Neck Cat. No.
0	120mm	7131-2370	7136-3499	7136-2703
1H	135mm	7131-2371	7136-3501	7136-2704
2H	135mm	7131-2372	7136-3502	7136-2704
3H	135mm	7131-2373	7136-3503	7136-2705
4H	135mm	7131-2374	7136-3504	7136-2705
5H	135mm	7131-2375	7136-3505	7136-2705

CPCS
Primary High Offset Stems
Stainless Steel – ASTM F 1586

Size	Stem Length	Implant Cat. No.	Broach/Trial Cat. No.	Trial Neck Cat. No.
0	120mm	7131-2390	7136-3499	7136-2703
1H	135mm	7131-2391	7136-3501	7136-2704
2H	135mm	7131-2392	7136-3502	7136-2704
3H	135mm	7131-2393	7136-3503	7136-2705
4H	135mm	7131-2394	7136-3504	7136-2705
5H	135mm	7131-2395	7136-3505	7136-2705

Catalog Information - Femoral Stem & Head Components

CoCr 12/14 Femoral Heads

Cobalt Chromium – ASTM F 799

Neck Length	22mm	26mm
-3	—	—
+0	7130-2200	7130-2600
+4	7130-2204	7130-2604
+8	7130-2208	7130-2608
+12	7130-2212	7130-2612
+16	—	—

Neck Length	28mm	32mm
-3	7130-2803	7130-3203
+0	7130-2800	7130-3200
+4	7130-2804	7130-3204
+8	7130-2808	7130-3208
+12	7130-2812	7130-3212
+16	7130-2816	7130-3216

SST 12/14 Femoral Heads

Stainless Steel – ASTM F 1586

Neck Length	22mm	26mm
-3	—	—
+0	7129-2200	7129-2600
+4	7129-2204	7129-2604
+8	7129-2208	7129-2608
+12	7129-2212	7129-2612
+16	—	—

Neck Length	28mm	32mm
-3	7129-2803	7129-3203
+0	7129-2800	7129-3200
+4	7129-2804	7129-3204
+8	7129-2808	7129-3208
+12	7129-2812	7129-3212
+16	7129-2816	7129-3216

CPCS Distal Centralizers

Cat. No.	OD
7131-2400	0mm
7131-2408	8mm
7131-2410	1mm
7131-2412	12mm
7131-2414	14mm
7131-2416	16mm
7131-2418	18mm

Catalog Information - Instrumentation

Trial 12/14 Taper Femoral Heads

Neck Length	Color Code	22mm	*26mm	*28mm	32mm
–3	Green	—	—	7135-2803	7135-3203
+0	Yellow	7135-2200	7135-2600	7135-2800	7135-3200
+4	Red	7135-2204	7135-2604	7135-2804	7135-3204
+8	White	7135-2208	7135-2608	7135-2808	7135-3208
+12	Blue	7135-2212	7135-2612	7135-2812	7135-3212
+16	Black	—	—	7135-2816	7135-3216

**Space allowed for 26 mm and 28 mm heads in instrument tray.*

CPCS◇ Trial Necks

Size	Primary Standard Offset Cat. No.	Size	Primary High Offset Cat. No.
0	7136-2700	0H	7136-2703
1,2	7136-2701	1H,2H	7136-2704
3,4,5	7136-2702	3H,4H,5H	7136-2705

Osteotomy Guide

Cat. No.	Size
7136-4000	Sizes 0–5

Broach Handle

Cat. No. 7136-4007

Box Chisel

Cat. No.	Size
7136-4002	Small

Anteversion Handle

Cat. No. 7136-4012

Trochanteric Reamer

Cat. No. 7136-4015

Femoral Head Impactor

Cat. No. 7136-4009

Blunt Medullary Reamer

Cat. No. 11-9657

Catalog Information - Instrumentation

Femoral Sounds

Cat. No.	Size
7136-3508	8-9mm
7136-3510	10-11mm
7136-3512	12-13mm
7136-3514	14-15mm
7136-3516	16-17mm
7136-3518	18-19mm

Broaches/Trials

Cat. No.	Size
7136-3499	Starter
7136-3500	Size 0
7136-3501	Size 1
7136-3502	Size 2
7136-3503	Size 3
7136-3504	Size 4
7136-3505	Size 5

CPCS◇ Inserter Handle

Cat. No. 7136-2630

CPCS Femoral Stem Driver

Cat. No. 7136-2631

Calcar Reamers

Cat. No.	Size
7136-4004	Small
7136-4005	Large

CPCS Primary Instrument Tray

Cat. No. 7136-3528

Small Exterior Carrying Case

Not Shown

Cat. No. 7112-9401

Lid for Exterior Carrying Case

Not Shown

Cat. No. 7112-9402

Femoral Sound Tray

Not Shown

Cat. No. 7136-3529

Catalog Information - Cement & Accessories

PREP-IM® Kit

Cat. No. 12-1000

Kit contains the following:

Cat. No.	Description
12-9418	BUCK® Cement Restrictor, 18.5mm
12-9419	BUCK Cement Restrictor, 25mm
11-0003	Femoral Canal Brush, 19mm
11-1000	Concise Cement Sculps Kit
11-0037	Femoral Canal Suction Absorber, 19mm
—	Disposable Cement Restrictor Tool (Available in kit only)

Vent Opening Tool

Cat. No. 11-0028

BUCK Cement Restrictor

Cat. No.	Size
12-9418	18.5mm
12-9419	25mm
7127-9420	30mm
7127-9421	35mm

Concise Cement Sculps Kit

Cat. No. 11-1000
(one of each)

Femoral Canal Suction Absorber

Cat. No.	Size
11-0037	19mm
11-0038	25mm

Catalog Information - Cement & Accessories

Femoral Pressurizers

Cat. No.	Size
7127-0026	Small
7127-0027	Medium
7127-0028	Large

BUCK Femoral Cement Restrictor Inserter

Cat. No. 11-2428

Femoral Canal Brush

Cat. No.	OD
11-0003	19mm
11-0033	12.5mm

MIXOR® Vacuum Mixing System with Syringe

Cat. No. 7127-0020

Femoral Cement Compressor

Cat. No. 11-1434

Catalog Information - Cement & Accessories

Disposable Femoral Cement Compressor Cap

Cat. No. 11-1435

MIXOR® Pump and Hose Kit

Cat. No. 7127-0040

MIXOR Hose Only

(not shown)

Cat. No. 7127-0041

MIXOR Pump Only

(not shown)

Cat. No. 7127-0042

Injector Gun

Cat. No. 7127-2000

VORTEX® Vacuum Mixer

Cat. No. 7127-0070

VERSABOND®

Cat. No. 7127-1140

VERSABOND Sample

Cat. No. 7127-0094

Catalog Information - Cement & Accessories

Connector, Schraeder
Cat. No. 7127-0050

Connector, Drager
Cat. No. 7127-0051

Connector, DISS
Cat. No. 7127-0052

Handpiece with Zimmer Coupling
Cat. No. 7127-7000

Powerhose with Zimmer Coupling
Cat. No. 7127-7001

Hip and Knee without suction
Cat. No. 7127-7004

Hip and Knee without Suction
Cat. No. 7127-7005

Orthopaedic Reconstruction
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USA

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