Surgical Technique

smith&nephew

ANTHOLOGY®
Primary Hip System

ANTHOLOGY® AFIT®
Primary Hip System

iMOD
Primary Hip Stem Instruments

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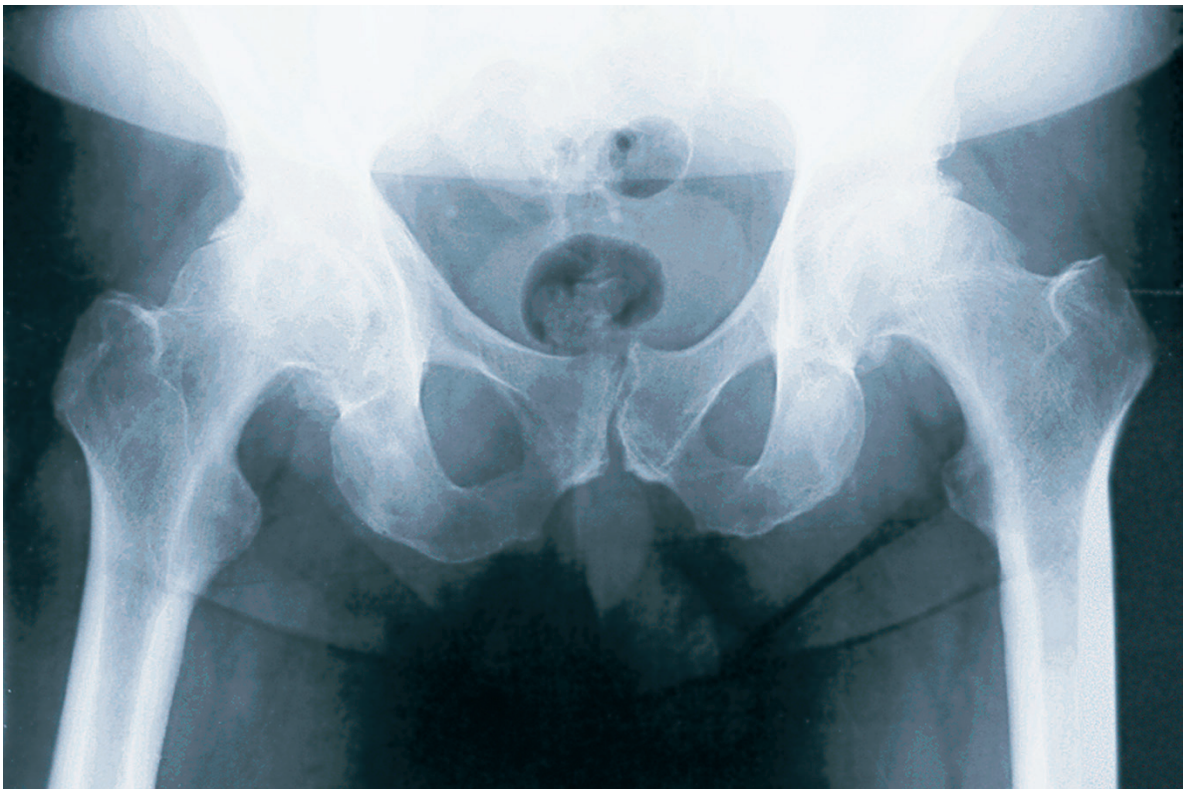
Disclaimer:
The following technique is for informational and educational purposes only. It is not intended to serve as medical advice. It is the responsibility of treating physicians to determine and utilize the appropriate products and techniques according to their own clinical judgment for each of their patients. For more information on the ANTHOLOGY stem, including its indications for use, contraindications, and product safety information, please refer to the product's label and the Instructions for Use.

Preoperative planning

The goal of preoperative planning is to determine the correct stem size, level of the femoral neck cut, and proper head and stem offset combination. Preoperative templating requires at least an anteroposterior (AP) radiograph of the pelvis and a lateral radiograph of the affected hip. If the opposite hip is unaffected by disease, it can often provide accurate sizing information for the femoral stem.

To determine if a patient has a leg length discrepancy, the AP radiograph should be used. Draw a line tangential to both of the ischia or both of the obturator foramens. This line should extend out until it contacts the medial cortex of bone on both femurs. If the patient's legs are of equal length, the line that has been drawn will contact both femurs at the same level. If the patient's legs are of unequal length, the lines will contact the femurs at different levels along the femur. Select a reference point along the femur, such as the bottom of the lesser trochanter. The distance between the line that has been drawn and the reference point on both femurs is measured. The difference in these measurements indicates the patient's leg length discrepancy.



Anteroposterior radiograph demonstrating leg length inequality

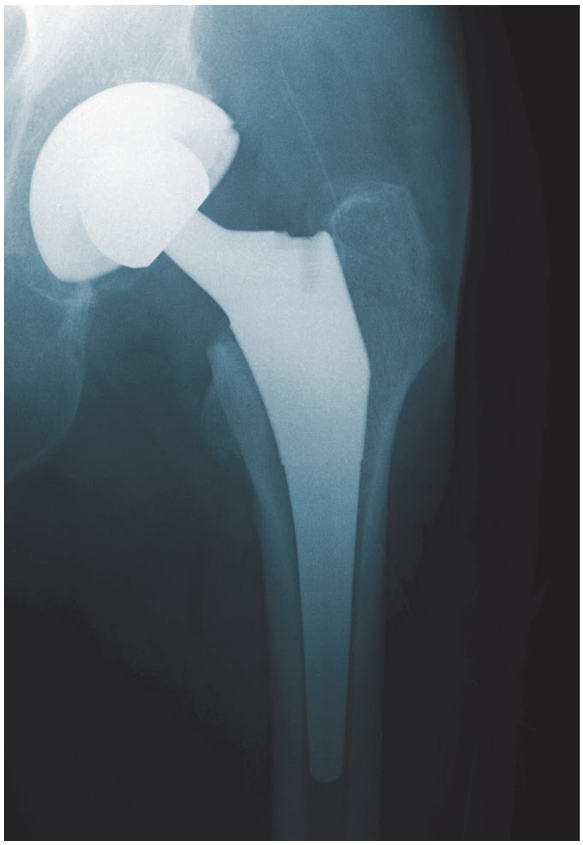
Nota Bene: The technique description herein is made available to the healthcare professional to illustrate the suggested treatment for the uncomplicated procedure. In the final analysis, the preferred treatment is that which addresses the needs of the patient.

WARNING: Hip Flexion Contracture — Don't be fooled by a hip flexion contracture which makes the leg appear short on X-Ray.

Note: Using this method of templating for leg length discrepancy assumes the patient has a normal, symmetrical pelvis and has neutral limb positioning.

When determining which size ANTHOLOGY® stem to use, the AP and the lateral radiographs should be templated. (Make sure you are looking at a true AP X-Ray. If needed, template off contralateral "normal" hip.) Using the anteroposterior radiograph, place the femoral templates over the proximal femur of both the affected and unaffected hips. The junction of the lateral femoral neck and greater trochanter serves as a good reference point for placement of the X-Ray templates. Place a mark at this junction and in the center of the femoral head. Align the lateral shoulder of the prosthesis with the mark at the junction. Find the appropriate stem that fits and fills the proximal femur and whose neck length matches the center of the femoral head.

For the ANTHOLOGY stem system, it is important to template for proximal fixation, not distal fixation. Make sure distal stem is not larger than the medullary canal width.



Anteroposterior radiograph of a properly implanted porous-coated ANTHOLOGY stem

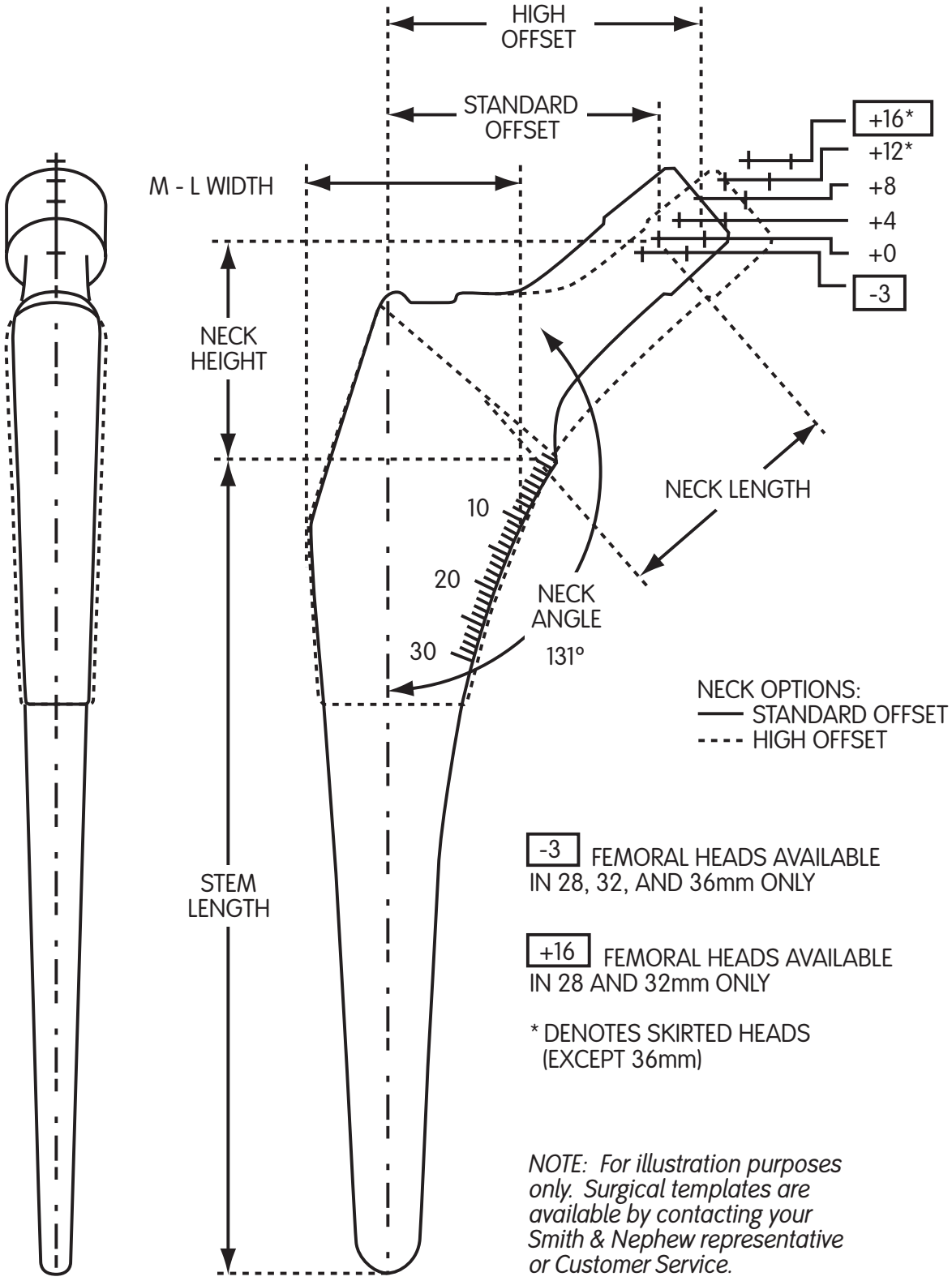
Specifications

Specifications			
Size	Neck Angle	Stem Length	M-L Width
1	131°	100mm	22mm
2	131°	102mm	23mm
3	131°	104mm	25mm
4	131°	106mm	26mm
5	131°	108mm	27mm
6	131°	110mm	29mm
7	131°	112mm	30mm
8	131°	114mm	32mm
9	131°	116mm	33mm
10	131°	118mm	34mm
11	131°	120mm	36mm
12	131°	122mm	37mm

Neck Height mm						
When Femoral Head Component Selected is:						
Size	-3	+0	+4	+8	+12	+16
1	24	26	29	31	34	37
2	25	27	29	32	35	37
3	26	27	30	33	35	38
4	26	28	31	33	36	38
5	27	29	31	34	37	39
6	27	29	32	35	37	40
7	28	30	33	35	38	40
8	29	31	33	36	38	41
9	29	31	34	36	39	42
10	30	32	35	37	40	42
11	31	33	35	38	40	43
12	31	33	36	39	41	44

Neck Offset mm												
	Standard Offset						High Offset					
Size	-3	+0	+4	+8	+12	+16	-3	+0	+4	+8	+12	+16
1	29	32	35	38	41	44	35	38	41	44	47	50
2	30	33	36	39	42	45	36	39	42	45	48	51
3	31	33	37	40	43	46	37	39	43	46	49	52
4	32	34	38	41	44	47	38	40	44	47	50	53
5	33	35	39	42	45	48	39	41	45	48	51	54
6	34	36	40	43	46	49	40	42	46	49	52	55
7	36	38	41	44	47	50	44	46	49	52	55	58
8	37	39	42	45	48	51	45	47	50	53	56	59
9	38	41	44	47	50	53	46	49	52	55	58	61
10	40	42	45	48	51	54	48	50	53	56	59	62
11	41	43	46	49	52	55	49	51	54	57	60	63
12	42	44	47	50	53	56	50	52	55	58	61	64

Neck Length mm												
	Standard Offset						High Offset					
Size	-3	+0	+4	+8	+12	+16	-3	+0	+4	+8	+12	+16
1	25	28	32	36	40	44	29	32	36	40	44	48
2	26	29	33	37	41	45	30	33	37	41	45	49
3	27	30	34	38	42	46	31	34	38	42	46	50
4	27	30	34	38	42	46	31	34	38	42	46	50
5	28	31	35	39	43	47	32	35	39	43	47	51
6	29	32	36	40	44	48	33	36	40	44	48	52
7	30	33	37	41	45	49	35	38	42	46	50	54
8	31	34	38	42	46	50	36	39	43	47	51	55
9	31	34	38	42	46	50	37	40	44	48	52	56
10	32	35	39	43	47	51	38	41	45	49	53	57
11	33	36	40	44	48	52	38	41	45	49	53	57
12	34	37	41	45	49	53	39	42	46	50	54	58



-3 FEMORAL HEADS AVAILABLE IN 28, 32, AND 36mm ONLY

+16 FEMORAL HEADS AVAILABLE IN 28 AND 32mm ONLY

* DENOTES SKIRTED HEADS (EXCEPT 36mm)

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

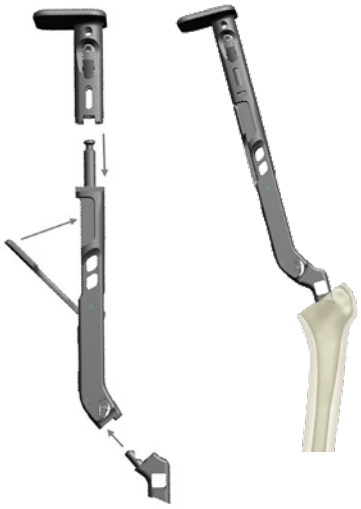
NOT ACTUAL SIZE

Femoral osteotomy

Note: Knock plate can be assembled in four different directions.

Femoral canal preparation

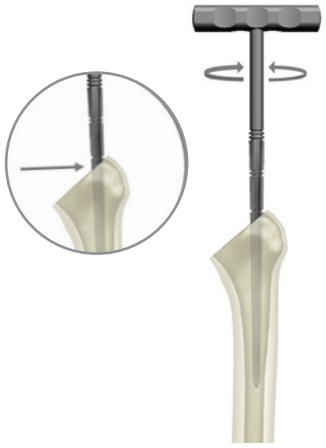
Assembly and Insertion of Box Osteotome



Assembly and Insertion of Lateralizing Rasp*

*For anterior approaches, a lateralizing rasp can be attached to preferred broach handle to assure proper lateral positioning for the femoral broach

Femoral canal preparation continued



Starter broach assembly/disassembly

Broach assembly/disassembly

Femoral broaching

Calcar preparation

Trial reduction

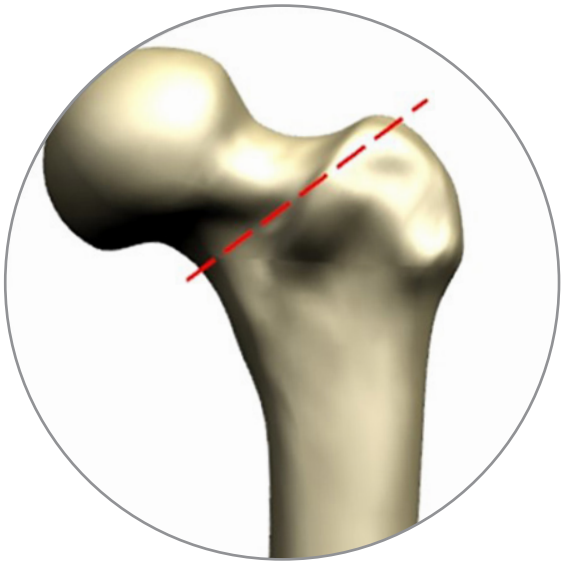
Stem insertion for rigid insertion

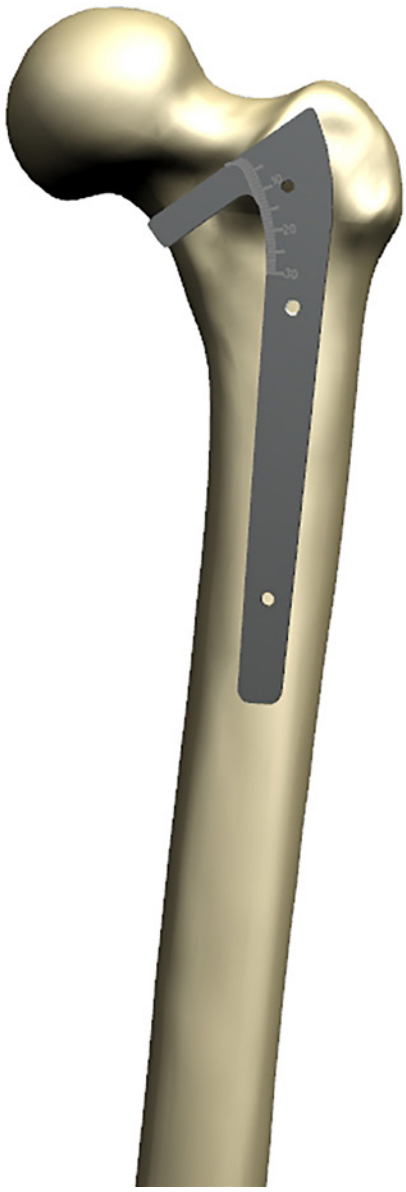
Stem insertion for non-rigid insertion

Final trial reduction

Femoral head assembly

Before surgery, review instrument sets to ensure all instruments are present and working properly.



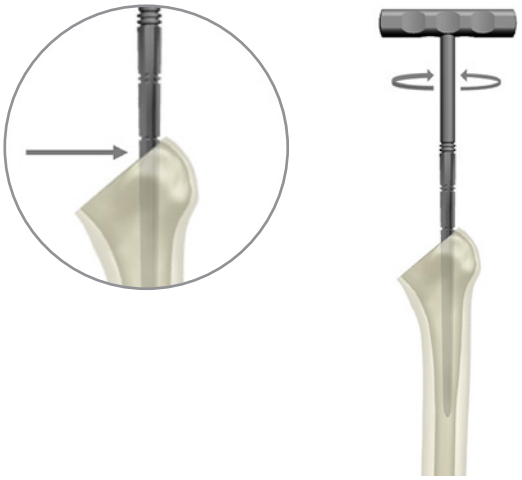


Femoral osteotomy
The point of the femoral neck resection should be marked with electrocautery corresponding to both the preoperative templating and the intraoperative measurement. Use the provided Femoral Neck Resection Guide to replicate the level of neck resection determined by your Pre-op Planning. Osteotomize the femoral neck.

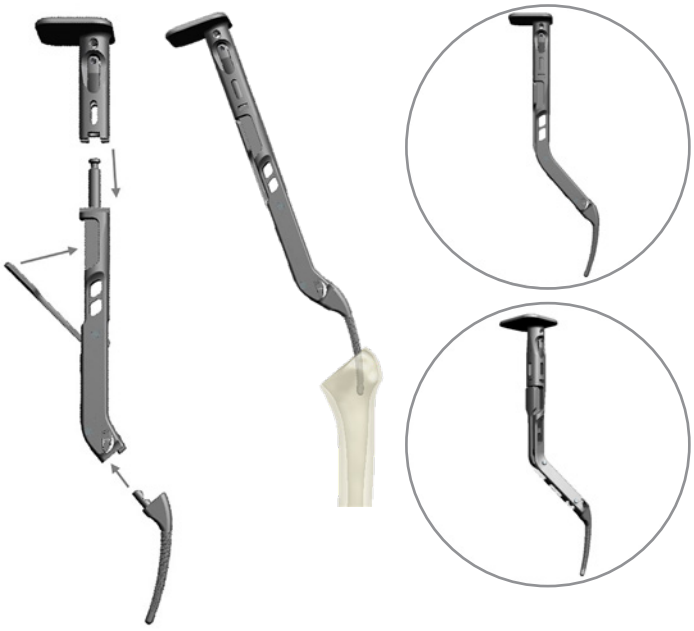
Prepare acetabulum
If acetabular reconstruction is required, prepare the acetabulum using the surgical technique for the intended acetabular component.

Femoral canal preparation
Use the box osteotome by attaching it to the preferred broach handle and strike plate. Utilize the canal finder or initial entry into femoral canal.

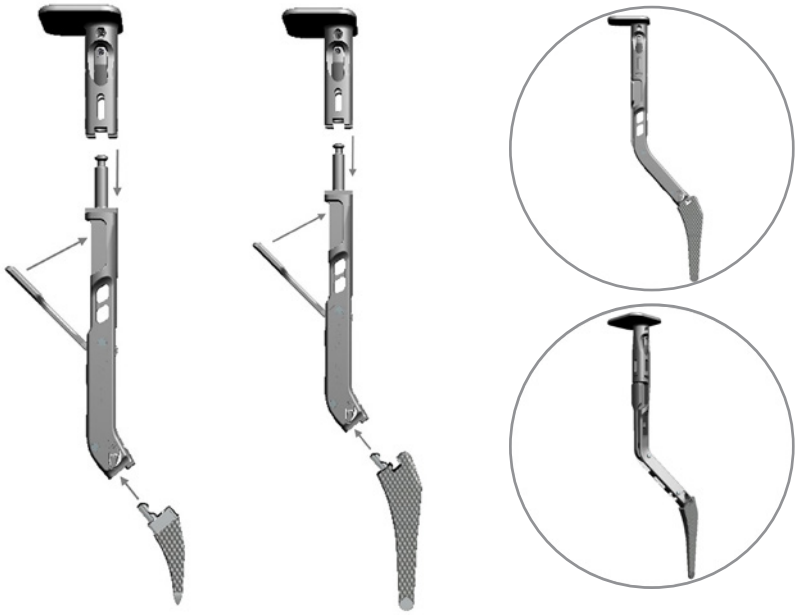
Note: It is important to stay lateral with the box osteotome and the canal finder. Care should be taken to ensure that the initial reaming tract into the femur is in neutral alignment with the femoral axis.



If desired a laterizing rasp can be attached to preferred broach handle to assure proper lateral positioning for the femoral broach.



Broach assembly/disassembly
Assemble the broach strike plate to the broach handle by placing the broach handle in to the strike plate. The strike plate offset can be positioned in the 12:00, 3:00, 6:00 or 9:00 position. Unlock the broach handle by pulling the locking handle away from the body of the broach handle. Insert the post of the broach into the broach handle and lock by moving the locking handle to the closed position. A modular anteversion handle can be assembled to the broach handle to provide version control. Disassemble the broach from the broach handle by lifting the lever to release the handle from the broach post.



Femoral broaching
Start the broaching procedure along the axis of the femur with the starter broach. Sequential broaching should then be carried out to the templated stem size using valgus force on the stem handle. Taking care to preserve the greater trochanter, the starter broach or lateralizing rasp can be used to rasp laterally beneath the greater trochanter. Be sure to check the stability of the broach rotationally, medially and laterally. When broaching keep version constant. Stop broaching only when stability is achieved. It is important to maintain broach rotation due to the rectangular geometry of the implant.

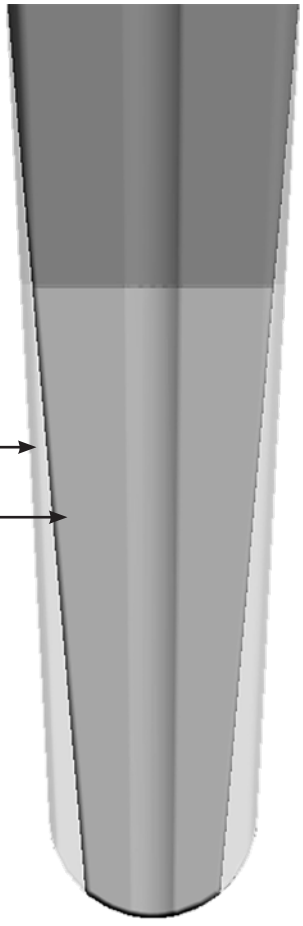
Note: Care should be taken not to force a broach that is too large into the femur. Consideration should be given to using a stem size smaller than the size templated if the final broach is difficult to seat. This helps avoid intraoperative fractures of the femur.

Note: The ANTHOLOGY® AFIT® has a reduced distal diameter in sizes 3-14. At approximately 90mm distal to the head center (+0 head), the taper changes from 6° to 10° resulting in an approximate reduction in cross section of 1mm each side medial and lateral. (See diagram below for example)

ANTHOLOGY Broach

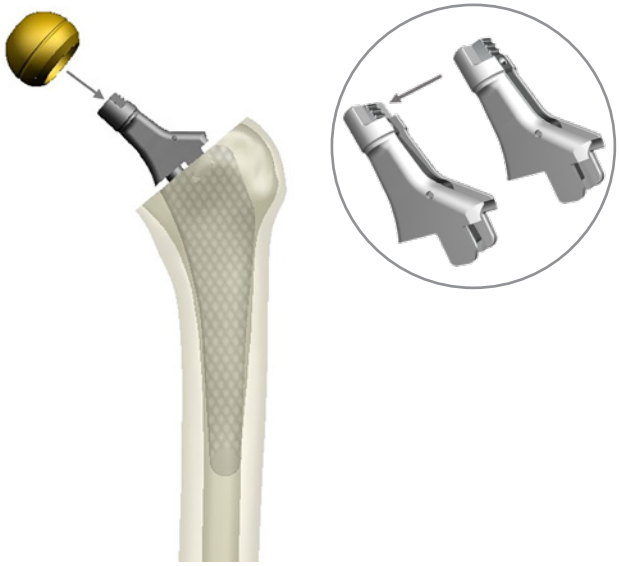
ANTHOLOGY AFIT Broach

ANTHOLOGY AFIT Stem

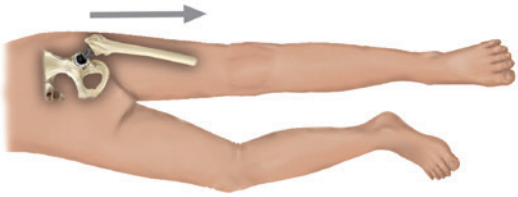


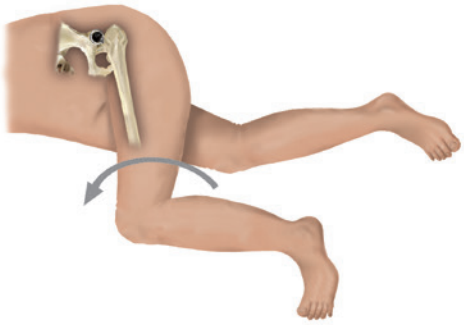
Calcar preparation
With the final broach fully seated, remove the broach handle. Place the calcar reamer over the post of the broach and machine the femoral neck, ensuring alignment to avoid femur fracture.

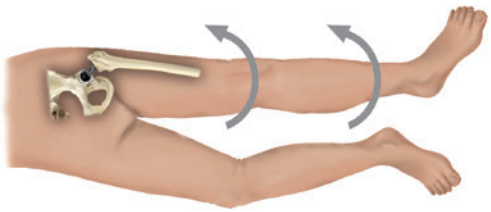
Trial reduction
Place the standard or high offset trial neck (as determined by templating) onto the broach post using the forceps. Select the trial femoral head of desired diameter and +0 neck length and place onto the trial neck. Reduce the hip and re-measure leg length. Compare to previous measurements recorded from preoperative templating or leg length before dislocation. Adjustments in neck length and/or offset can be made at this time. If trialing for a unipolar or bipolar, trial according to the appropriate technique for the selected device.

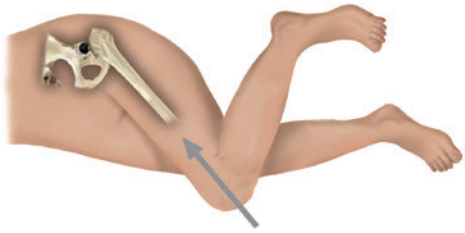


Trial reduction









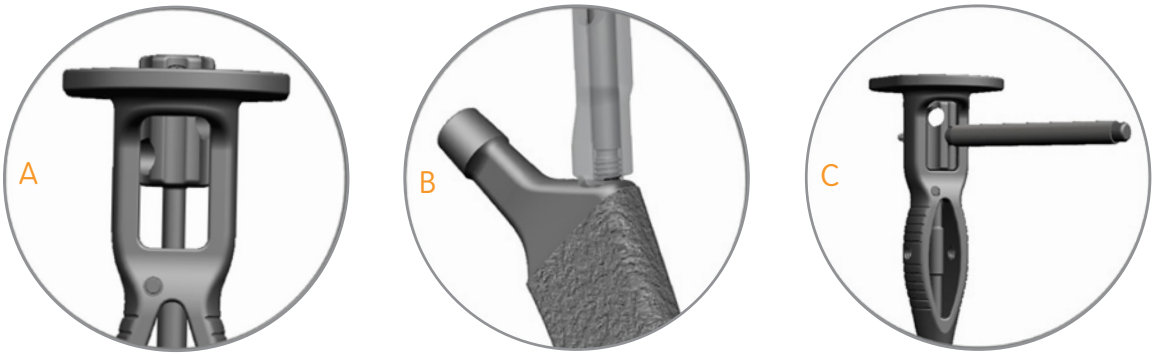
Reduce the hip and evaluate in the following ways:

Soft tissue tension
Some shuck is normal when applying a longitudinal distraction force to the hip. Shuck should not be excessive, and the hip should not dislocate in straight traction.

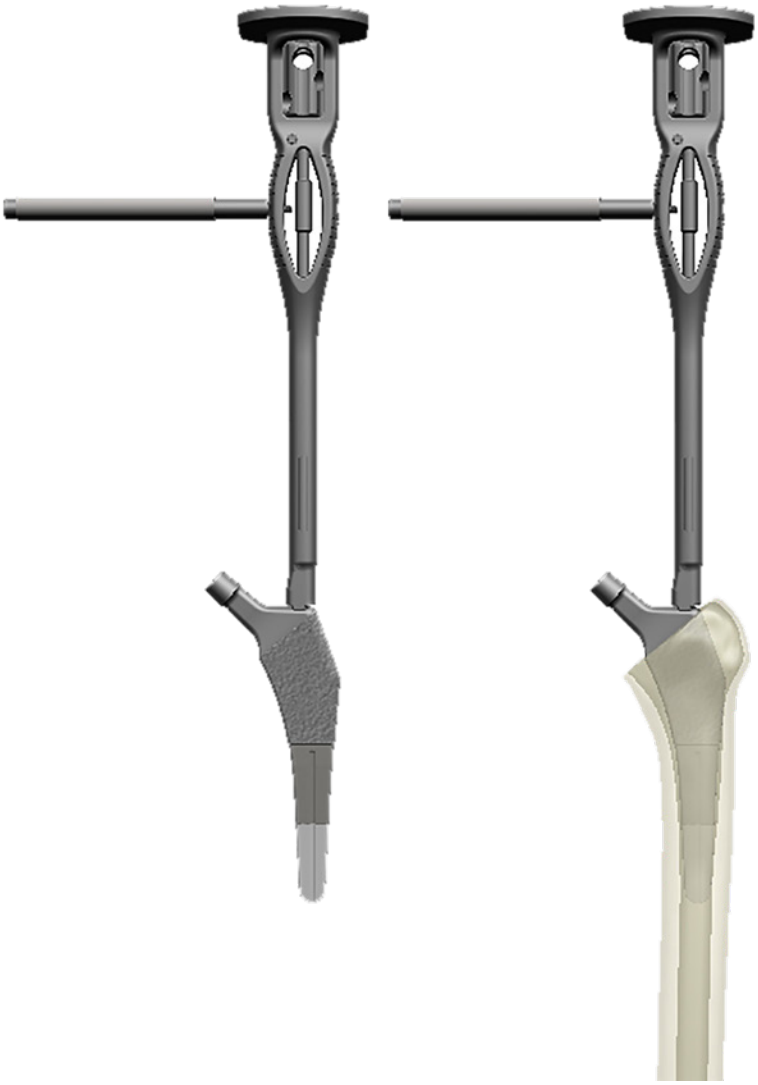
Anterior stability
Place the leg in full adduction and hyperextension, while exerting an external rotation force. If the hip cannot be fully extended, it may be too tight. If it dislocates easily, it is too loose and impingement must be addressed or component malposition exists.

Posterior stability
Place the leg in adduction and 90° flexion. Gradually rotate internally. The hip should be stable with 45° of internal rotation. If it dislocates with minimal internal rotation, it is too loose and impingement must be addressed or component malposition exists.

Sleep position
Place the leg in the “sleep position” with the operated leg semi-flexed, adducted and internally rotated over the other leg. Apply axial force to try to dislocate. This position represents a dangerously unstable position that may be adopted by a patient sleeping on their non-operated side.

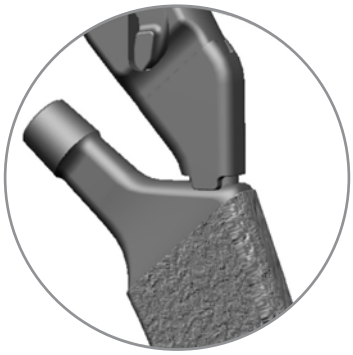


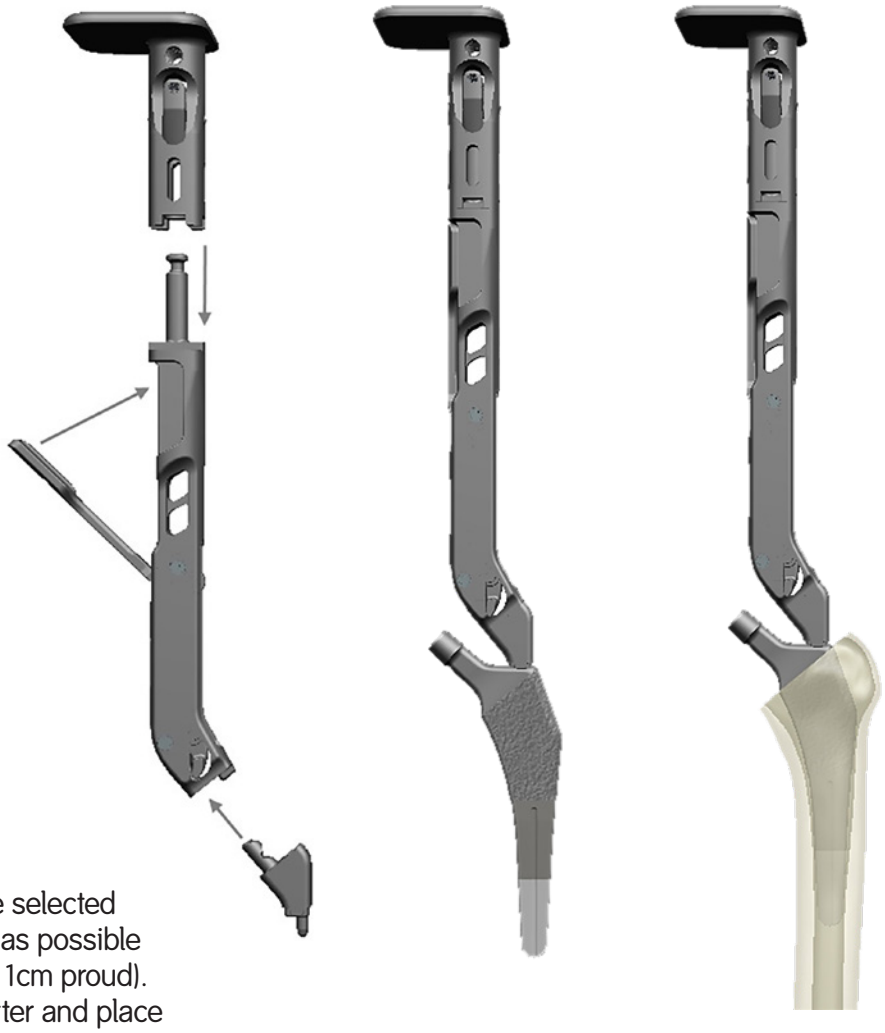
Stem insertion
For a rigid insertion stand the stem inserter upright so that the threaded tip is pointed up. Screw stem inserter rod into the implant as far as possible using the thumb screw under the strike plate. Flip the assembly over so that the stem tip is now pointing down. For additional security, the version rod can be used to complete the tightening process by inserting it into one of openings of the thumb screw and tightening. The version rod can be moved to corresponding opening on either side of the handle to help align version. Apply hand pressure and rotate the stem into the correct position. Use gentle mallet blows with valgus force on the inserter to seat the stem to the position of the neck resection. Check stem stability. If the implant has stopped moving with gentle mallet blows and is not completely seated, remove the stem and repeat the same size broaching steps.



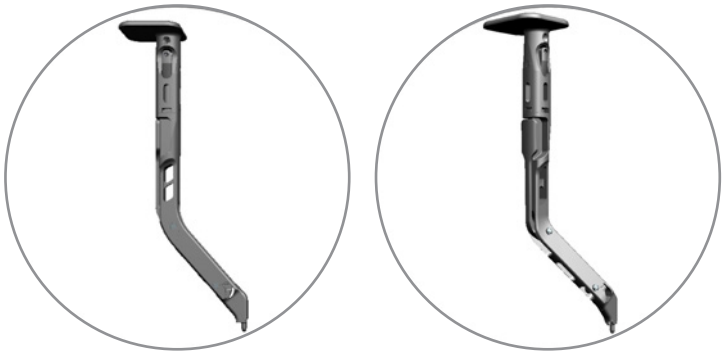
CAUTION: Do not use excessive force to seat the stem.

Note: Make sure the stem inserter is not impinging on the trochanter. This may cause inadequate stem seating or trochanteric fracture or varus positioning.





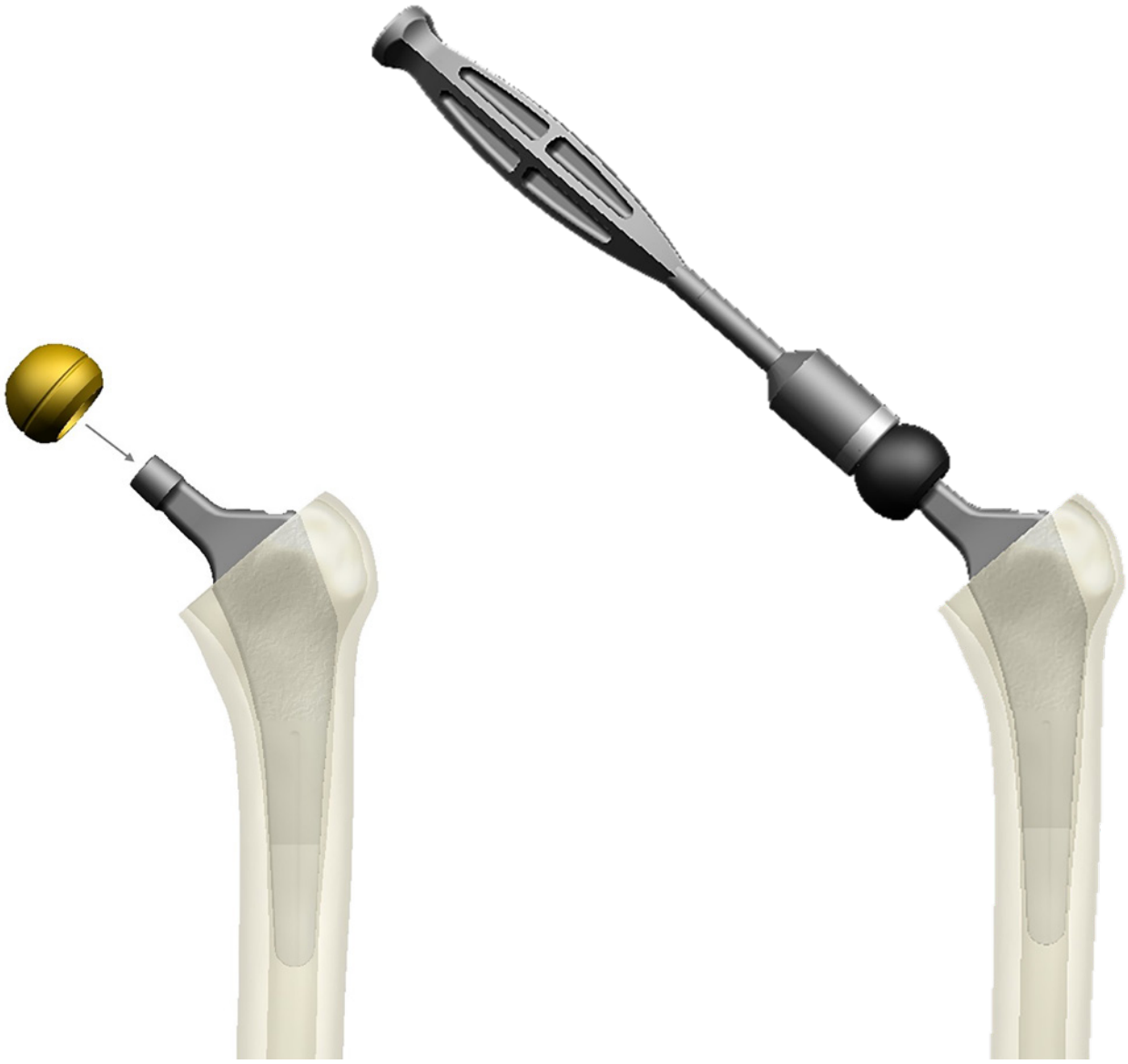
Stem insertion
For a non-rigid insertion insert the selected femoral stem into the canal as far as possible by hand (should sit approximately 1cm proud). Take the non-threaded stem inserter and place it into the preferred broach handle and strike plate. Apply hand pressure and rotate the stem into the correct position. Use gentle mallet blows to seat the stem to the position of the neck resection. Check stem stability. If the implant has stopped moving with gentle mallet blows and is not completely seated, remove the stem and repeat the same size broaching steps.



CAUTION: Do not use excessive force to seat the stem.

Note: Make sure the stem inserter is not impinging on the trochanter. This may cause inadequate stem seating or trochanteric fracture or varus positioning.

For Anterior approach, you may use offset handle.



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

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

Catalog information

ANTHOLOGY® Standard Offset Implant Set — Cat. No. 7135-6000

ANTHOLOGY Standard Offset Porous Stem

Size	Cat. No.	Size	Cat. No.	Size	Cat. No.
1	7135-6001	5	7135-6005	9	7135-6009
2	7135-6002	6	7135-6006	10	7135-6010
3	7135-6003	7	7135-6007	11	7135-6011
4	7135-6004	8	7135-6008	12	7135-6012

Sample 7137-6007

ANTHOLOGY High Offset Implant Set — Cat. No. 7135-6100

ANTHOLOGY High Offset Porous Stem

Size	Cat. No.	Size	Cat. No.	Size	Cat. No.
1	7135-6101	5	7135-6105	9	7135-6109
2	7135-6102	6	7135-6106	10	7135-6110
3	7135-6103	7	7135-6107	11	7135-6111
4	7135-6104	8	7135-6108	12	7135-6112

Sample 7137-6107

ANTHOLOGY Standard Offset Plus HA Implant Set — Cat. No. 7135-7000

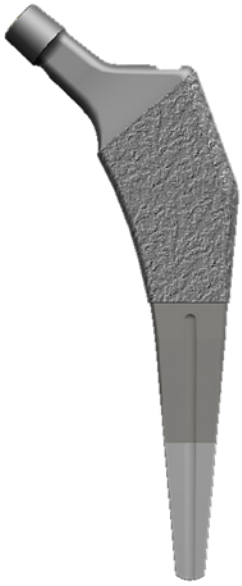
ANTHOLOGY Standard Offset Porous Plus HA Stem

Size	Cat. No.	Size	Cat. No.	Size	Cat. No.
1	7135-7001	5	7135-7005	9	7135-7009
2	7135-7002	6	7135-7006	10	7135-7010
3	7135-7003	7	7135-7007	11	7135-7011
4	7135-7004	8	7135-7008	12	7135-7012

ANTHOLOGY High Offset Plus HA Implant Set — Cat. No. 7135-5700

ANTHOLOGY High Offset Porous Plus HA Stem

Size	Cat. No.	Size	Cat. No.	Size	Cat. No.
1	7135-7101	5	7135-7105	9	7135-7109
2	7135-7102	6	7135-7106	10	7135-7110
3	7135-7103	7	7135-7107	11	7135-7111
4	7135-7104	8	7135-7108	12	7135-7112



ANTHOLOGY AFIT® Standard Offset Plus HA Implant Set**

Size	Cat. No.	Size	Cat. No.
3	7193-5563	9	7193-5569
4	7193-5564	10	7193-5570
5	7193-5565	11	7193-5571
6	7193-5566	12	7193-5572
7	7193-5567	13	7193-5573
8	7193-5568	14	7193-5574

ANTHOLOGY AFIT High Offset Plus HA Implant Set**

Size	Cat. No.	Size	Cat. No.
3	7193-5575	9	7193-5581
4	7193-5576	10	7193-5582
5	7193-5577	11	7193-5583
6	7193-5578	12	7193-5584
7	7193-5579	13	7193-5585
8	7193-5580	14	7193-5586

**Not for use with ceramic on ceramics bearings

Catalog information

OXINIUM® Femoral Heads 12/14 Taper

Neck Length	28mm	32mm	36mm
-3	7134-2803	7134-3203	7134-3603
+0	7134-2800	7134-3200	7134-3600
+4	7134-2804	7134-3204	7134-3604
+8	7134-2808	7134-3208	7134-3608
+12	7134-2812	7134-3212	7134-3612
+16	7134-2816	7134-3216	——

OXINIUM Modular Femoral Heads

40mm	44mm
7134-2340	7134-2344

CoCr Femoral Heads 12/14 Taper – Cobalt Chromium – ASTM F 799

Neck Length	22mm	26mm	28mm	32mm	36mm
-3	——	——	7130-2803	7130-3203	7130-3603
+0	7130-2200	7130-2600	7130-2800	7130-3200	7130-3600
+4	7130-2204	7130-2604	7130-2804	7130-3204	7130-3604
+8	7130-2208	7130-2608	7130-2808	7130-3208	7130-3608
+12	7130-2212	7130-2612	7130-2812	7130-3212	——
+16	——	——	7130-2816	7130-3216	——

CoCr Modular Femoral Heads – Cobalt Chromium – ASTM F 799

40mm	44mm
7134-2640	7134-2644

Titanium Modular 12/14 Taper Sleeve

Neck Length	
-4	7134-4245
+0	7134-4247
+4	7134-4248
+8	7134-4249

Use with 40mm and 44mm OXINIUM® and CoCr Modular Femoral Heads

Biolox® delta Ceramic Femoral Heads 12/14 Taper

Neck Length	32mm	36mm	40mm
S/+0	7653-9160	7653-9165	7134-6004
M/+4	7653-9161	7653-9166	7134-6005
L/+8	7653-9162	7653-9167	7134-6006

Osteotomy Guide
Cat. No. 7136-4000

Modular Box Osteotome
Cat. No. 7136-5719

Starter Broach
Cat. No. 7136-5733

Modular Laterizing Rasp
Cat. No. 7136-5723

ANTHOLOGY Calcar Reamer
Cat. No. 7136-5702

MI Trial Femoral Head

Neck Length	28mm	32mm	36mm
-3	7136-9708	7136-9714	7136-9720
+0	7136-9709	7136-9715	7136-9721
+4	7136-9710	7136-9716	7136-9722
+8	7136-9711	7136-9717	7136-9723
+12	7136-9712	7136-9718	7136-9724
+16	7136-9713	7136-9719	——

Femoral Head Trial (optional)

Neck length	40mm	44mm
-4	7136-6516	7136-0812
+0	7136-6517	7136-0813
+4	7136-6518	7136-0814
+8	7136-6519	7136-0815

ANTHOLOGY Trial Neck *i* Standard Offset

Size	Cat. No.
1-6	7136-5821
7-12	7136-5822
13-14	7136-5823

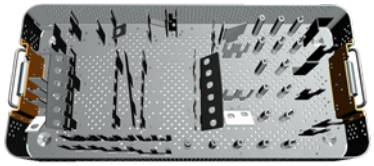
ANTHOLOGY Trial Neck *i* High Offset

Size	Cat. No.
1-6	7136-5824
7-12	7136-5825
13-14	7136-5826

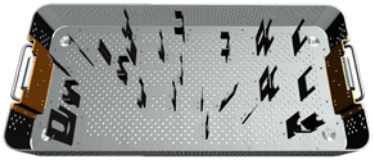
Catalog information

Femoral Head Impactor
Cat. No. 7136-4009

Anteversion Handle
Cat. No. 7136-4012



Core Instrument Trays
Cat. No. 7136-5842



Broach Handle Tray
Cat. No. 7136-5841

Dual Offset Broach Handle Tray
Cat. No. 7136-5732

Blunt Medullary Reamer
Cat. No. 11-9657

Broach Handle Strike Plate
Cat. No. 7136-5722

Straight Broach Handle
Cat. No. 7136-5727

Threaded Stem Inserter
Cat. No. 7136-5616

Soft Inserter
Cat. No. 7136-5617

Single Offset Broach Handle
Cat. No. 7136-5728

Dual Offset Broach Handle Set

Left Dual Offset Broach Handle
Cat. No. 7136-5731

Right Dual Offset Broach Handle
Cat. No. 7136-5729

ANTHOLOGY® Broach

Size	Cat. No.	Size	Cat. No.
1	7136-5301	8	7136-5308
2	7136-5302	9	7136-5309
3	7136-5303	10	7136-5310
4	7136-5304	11	7136-5311
5	7136-5305	12	7136-5312
6	7136-5306	13	7136-5313
7	7136-5307	14	7136-5314

ANTHOLOGY AFIT® Broach*

Size	Cat. No.	Size	Cat. No.
3	7136-5903	9	7136-5909
4	7136-5904	10	7136-5910
5	7136-5905	11	7136-5911
6	7136-5906	12	7136-5912
7	7136-5907	13	7136-5913
8	7136-5908	14	7136-5914

*For use with ANTHOLOGY AFIT HA Primary Cementless Stems Only
7193-5632 ANTHOLOGY AFIT Core Instrument Tray

Notes

Smith & Nephew, Inc.
1450 Brooks Road
Memphis, TN 38116
USA

Telephone: 1-901-396-2121
Information: 1-800-821-5700
Orders and Inquiries: 1-800-238-7538

www.smith-nephew.com

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