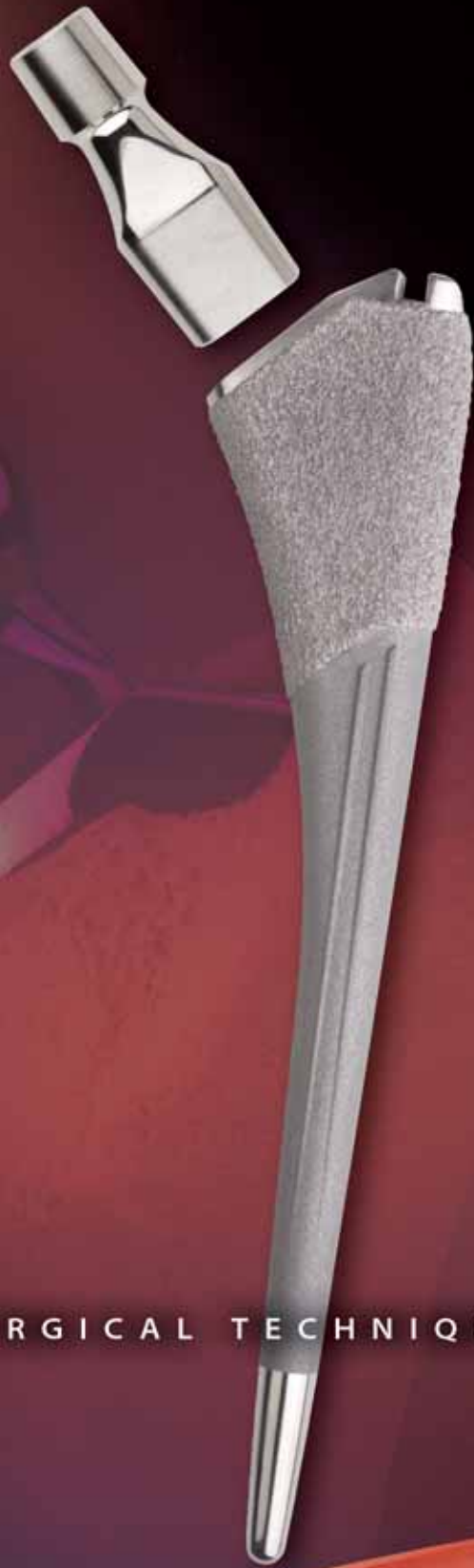


hip system solutions



SURGICAL TECHNIQUE

WRIGHT.

PROFEMUR[®] TAPERED STEM

Total Hip System

PROFEMUR® TAPERED STEM surgical technique

as described by MATTHEW J. KRAAY, MS, MD

reviewed by R. SCOTT CORPE, MD

and MICHAEL D. NEEL, MD

Proper surgical procedures and techniques are the responsibility of the medical professional. The following guidelines are furnished for information purposes only. Each surgeon must evaluate the appropriateness of the procedures based on his or her personal medical training and experience. Prior to use of the system, the surgeon should refer to the product package insert for complete warnings, precautions, indications, contraindications and adverse effects. Package inserts are also available by contacting Wright Medical Technology, Inc.

PROFEMUR® Tapered Stem
total hip SYSTEM

as described by Matthew J. Kraay, MS, MD

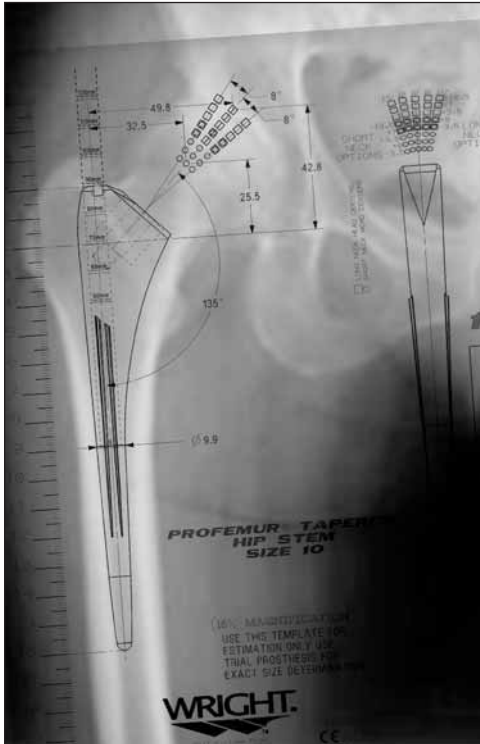


FIGURE 1 |

PREOPERATIVE PLANNING

NOTE | *Accurate preoperative templating requires good quality standardized radiographs of the pelvis and operative hip.*

Determine limb length discrepancy. Draw a line across the bottom of the ischium on the A/P view. The distance from this horizontal reference line to each lesser trochanter should then be measured. The difference between each measured side is the limb length discrepancy. If there is any asymmetry of the pelvis or if landmarks are not clear, other means to determine discrepancy should be used.

Determine the femoral head center. Once the center of rotation for the acetabular component has been determined, the center of rotation for the femoral head should be determined. Superimpose the femoral stem templates sequentially on the A/P x-ray with the templates positioned neutrally along the longitudinal axis of the femur. Estimate the metaphyseal and diaphyseal fit and anticipated level of implant insertion using the templates. The approximate femoral size and length of the femoral neck cut can be estimated from the templates. Neck angle, neck length, and head length which most closely corresponds to the patient's femoral head center can be estimated as well. The circles/squares found along the femoral neck axis represent the expected centers of rotation for the femoral head. For the ideal neck/head combination, the circle/square will align atop the previously determined center of rotation for the femoral head. In patients with significant deformity of the femoral head, templating can be performed on the opposite hip if necessary.

Each circle represents the center of rotation for a modular short neck with the corresponding head option (short to xx-long). Each square represents the center of rotation for a modular long neck with the corresponding head option (short to xx-long). The circles/squares on the AP template of the stem illustrate the impact of choosing an 8° varus/valgus neck relative to the neutral neck position. | **FIGURE 1** Measure the distance from the tip of the greater trochanter to the lateral shoulder of the implant. Note the reamer depth based on the anatomic landmark of the tip of the Greater Trochanter or neck resection.

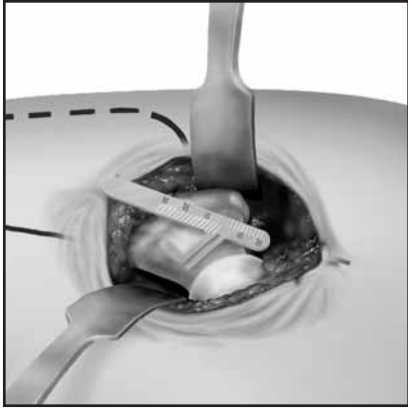


FIGURE 2 |

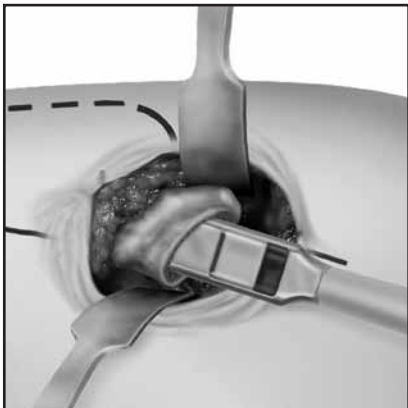


FIGURE 3 |

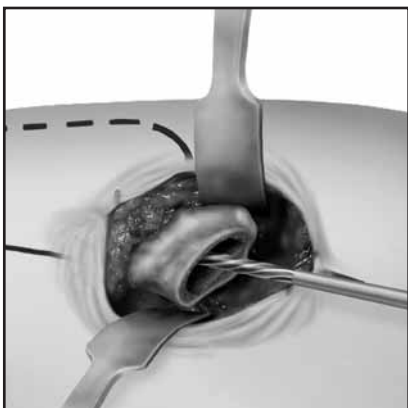


FIGURE 4 |

SURGICAL TECHNIQUE

NOTE | *PROFEMUR® Tapered Stem can be inserted through a variety of conventional or “minimally invasive” surgical approaches. Several techniques have been previously described for intraoperative assessment of restoration of leg length and stability of the components, and their use is recommended.*

STEP 1 - NECK RESECTION

The neck resection level can be estimated from the pre-operative templating and can be measured from the lesser or greater trochanter depending on surgeon preference. Resect the neck at a 45° angle to the longitudinal axis of the femur or using the neck resection guide. | **FIGURE 2**

STEP 2 - OPEN THE CANAL

Place the box osteotome at the base of the Greater Trochanter where it meets the superior aspect of the femoral neck and remove a sliver of cortical bone over the medial aspect of the Greater Trochanter. Since the longitudinal axis of the femur passes through this area near the piriformis fossa, this will facilitate neutral varus/valgus orientation of the reamers, broaches and implant. | **FIGURE 3**

STEP 3 - REAMING AND BROACHING OF THE CANAL

Enter the canal with the starter reamer attached to the T-handle. The reamer should be initially placed in the approximate area of the piriformis fossa and then directed distally towards the center of the knee or the intracondylar notch. As the reamers and broaches are advanced distally, laterally directed force on the reamers and broaches maintains appropriate neutral alignment relative to the longitudinal axis of the femur | **FIGURE 4.**

Using a combined reaming and broaching canal preparation technique, the medullary canal is sequentially reamed until initial diaphyseal contact of the reamer occurs at the depth corresponding with the reamer. Typically, a minimal amount of diaphyseal bone removal will be necessary due to the tapered design of the stem. Using a broach only technique, the femur can be sequentially broached, without reaming, using progressively larger broaches until stable fit of the broach in the femur is obtained.

The femur is sequentially broached using progressively larger broaches up to the size of the corresponding reamer last used. Broaches should be carefully advanced using a mallet with short, controlled strokes. Impaction of the broach should stop when the broach fails to advance with impaction or when the teeth of the broach are even with the neck cut. Rotational alignment of the broaches must match the anteversion and resultant

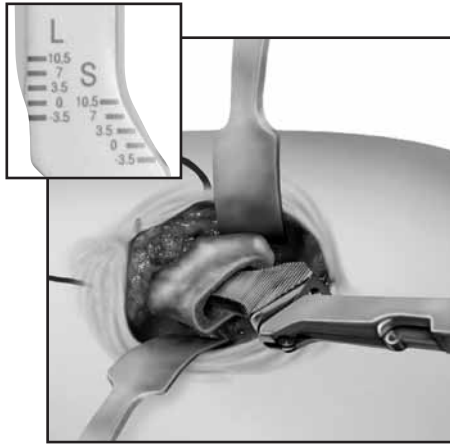


FIGURE 5 |

orientation of the patient's femoral neck. Abnormal femoral neck anteversion (relative retroversion or excessive anteversion) can be adjusted later with the modular necks. If the broach does not appear to be torsionally and axially stable, ream to the next size and then broach up to the corresponding size. To verify a secure fit, attempt to rotate the broach relative to the femur. Continue the above process until a stable fit of the broach in the femur is obtained. A well fitting broach will typically appear to fit tightly in the prepared femur with little remaining cancellous bone between the broach and endosteal cortex of the femur. At this point, leave the broach fully seated in the canal and detach the broach handle to allow for trial reduction. If a significant amount of reaming is required or if the broach does not appear to fit well in the proximal metaphysis (either unable to seat fully or appears undersized) intraoperative radiographs may be helpful in determining if the broach (or stem) is properly oriented in the canal.

TIP | A guide rod can be used with the broach handle to approximate 20° of anteversion.

The S-Scale marks on the broach handle correspond to the centers of rotation for a short neck and the respective femoral head. The L-Scale marks on the broach handle correspond to the center of rotation for a long neck and the respective femoral head. | **FIGURE 5**

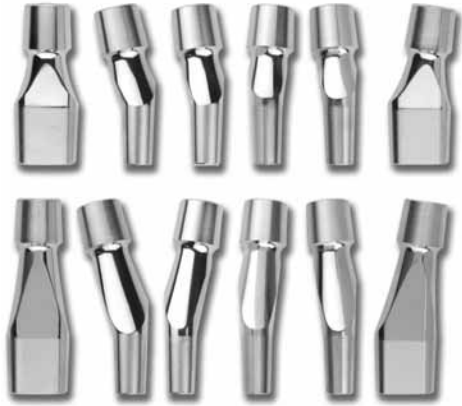


FIGURE 6 |

STEP 4 - TRIAL REDUCTION

Perform a reduction with the trial necks and heads. If the broach is inserted to the templated level, the femoral head center should be closely restored by using the templated neck and head combination. The head and neck can be placed into the wound retrograde. Stability of the hip will be determined by acetabular position, femoral stem position, and head and neck combination selected. Soft tissue tension, restoration of leg length, presence of implant impingement and combined anteversion between the femoral and acetabular component (using the Coplanar Test) should be assessed. Adequate stability of the hip anteriorly and posteriorly is essential. Leg length, lateral offset and femoral version can be adjusted with the modular neck and head components. It is essential that the anteverted/retroverted and valgus/varus modular necks be properly oriented for the desired adjustment in head center and for stability to be obtained. The acetabular component may need to be reoriented if optimal stability is not obtained with the modular heads and necks. Once a well-balanced hip has been created with a trial head and neck, remove the broach.

| **FIGURE 6**



BRIEF SUMMARY OF NECK OPTIONS

- Straight necks create a neutral neck axis of 135°. Long necks can often avert the need for a skirted head.
- Varus necks decrease the femoral neck angle to 127° (neutral position is 135°); the femoral head shifts medially and inferiorly; leg length is shortened; offset is increased.
- Valgus necks increase the femoral neck angle to 143° (neutral position is 135°); the femoral head shifts laterally and superiorly; leg length is increased; offset is decreased.
- Anteverted necks shift the femoral head anteriorly relative to the stem by 8° or 15°.
- Retroverted necks shift the femoral head posteriorly relative to the stem by 8° or 15°.
- AR/VV necks combine anteversion/retroversion and varus/valgus necks to offer a broad range of multi-dimensional head positions. Each AR/VV neck provides 4° of A/R and 6° of V/V.

STEP 5 - STEM IMPLANTATION

Thread the stem impactor on the lateral shoulder of the stem. | **FIGURE 7** Use a mallet with short, controlled strokes to seat the implant. Typically, the final implant position corresponds to the final position of the last broach used for the trial reduction. Impaction should stop when the implant fails to advance with impaction.

NOTE | *The implant may sit 1-2 mm proud of the final broach position due to the additional 0.25mm thickness per side of the plasma spray. The difference can be addressed during the final trial reduction by selecting a different head and neck combination.*

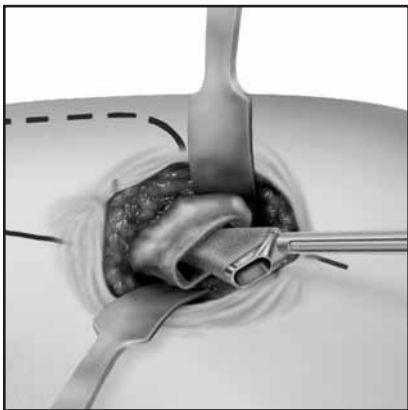


FIGURE 7 |

STEP 6 - FINAL TRIAL REDUCTION

Perform a final trial reduction using the plastic neck and head trials to assess limb length, offset, combined anteversion, both anterior and posterior stability, and impingement-free range of motion.

CAUTION | **DO NOT USE METAL TRIAL NECKS WITH THE IMPLANT! METAL TRIAL NECKS ARE ONLY TO BE USED WITH BROACHES SINCE THEY MAY DAMAGE THE NECK TAPER. ONLY PLASTIC TRIAL NECKS SHOULD BE USED FOR TRIAL REDUCTIONS WITH THE IMPLANT.**

STEP 7 - IMPLANT NECK AND HEAD

Carefully clean and dry implant tapers prior to assembly. Affix the femoral head and neck by striking the head impactor with several firm mallet blows. | **FIGURE 8**

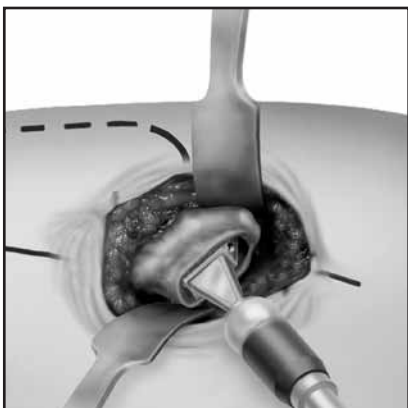


FIGURE 8 |

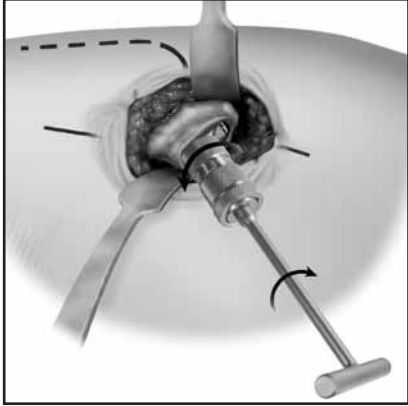


FIGURE 9 |

IMPLANT REMOVAL

FEMORAL HEAD EXTRACTION

The femoral head is removed by placing a plastic tipped femoral head impactor or tamp on the under side of the femoral head and applying mallet blows upward until the femoral head is removed.

FEMORAL NECK EXTRACTION

OPTION 1

If a long femoral neck is utilized, distract the barrel by threading it in a counter clockwise motion until the mark for the long neck designation is revealed. If a short femoral neck is utilized, screw the barrel all the way down. Place the femoral neck removal barrel over the femoral neck. Insert the T-handle through the slot in the proximal barrel and thread in a clockwise motion into the proximal hole on the femoral neck. Continue turning until the femoral neck is extracted. | FIGURE 9

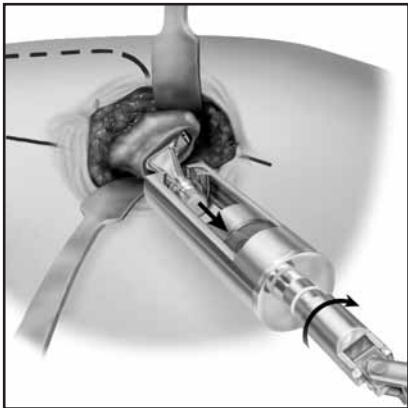


FIGURE 10 |

OPTION 2

Screw the femoral neck top hat onto the femoral neck in a clockwise motion. Place the extraction barrel underneath the femoral neck top hat. Using the spanner wrench on the top of the barrel, unscrew the barrel in a clockwise motion until the femoral neck is extracted.

| FIGURE 10

STEM EXTRACTION

Insert the stem extractor into the oval tapered pocket of the femoral stem. Screw the extractor bolt into the threaded hole inside of the neck pocket. The slide slap hammer is used to impact the handle until the stem is extracted. | FIGURE 11

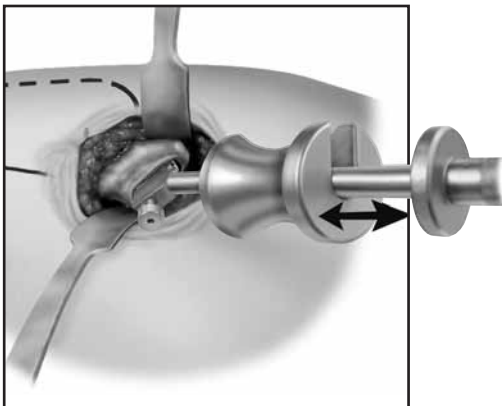


FIGURE 11 |



FIGURE 12 |



FIGURE 13 |



FIGURE 14 |

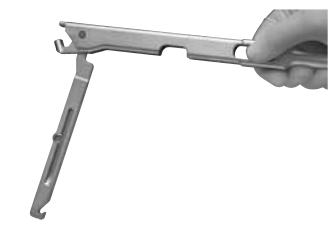


FIGURE 15 |



FIGURE 16 |

CLEANING INSTRUCTIONS

BROACH HANDLE DISASSEMBLY

Place the hex screwdriver into the allen screw into the recessed hole in the top of the broach handle. While applying downward pressure, turn the screw counterclockwise 1/4 of a turn. | **FIGURE 12** Remove the spring assembly. | **FIGURE 13** Push the button on the slide mechanism and pull the slide out. | **FIGURES 14 AND 15** Remove the trigger by pulling the larger trigger out of the hole. | **FIGURE 16**

BROACH HANDLE ASSEMBLY

Put the trigger into the hole leading with the smaller side. | **FIGURE 16** Insert the slide mechanism into the slot while aligning the trigger and slide hook. Push the button on the slide to fully seat it. | **FIGURE 14** Insert the spring assembly into the recessed hole while aligning the slots with the pins. | **FIGURE 13** Using a hex screwdriver, push down on the screw and turn clockwise 1/4 of a turn. | **FIGURE 12**

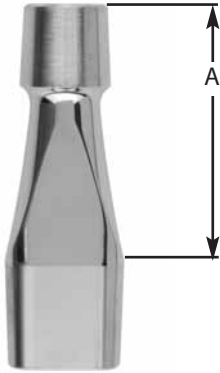
FEMORAL HEAD IMPACTOR

Unscrew the plastic impactor from the handle.

FEMORAL NECK EXTRACTOR

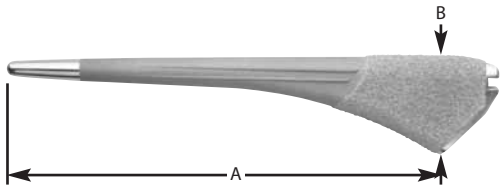
Unscrew the mechanism for cleaning.

APPENDIX A | REFERENCE CHARTS



DIMENSIONAL CHART | FEMORAL NECKS (mm)

TYPE	A	CATALOG #
NEUTRAL		
Short	28	PHA01202
Long	38.5	PHA01204
VARUS/VALGUS		
Short	27	PHA01252
Long	38	PHA01254
ANTE/RETRO 8 DEGREE		
Short	28	PHA01232
Long	38.5	PHA01234
ANTE/RETRO 15 DEGREE		
Short	28	PHA01242
Long	38.5	PHA01244
ANTE/RETRO - VARUS/VALGUS 1		
Short	28	PHA01222
Long	38.5	PHA01224
ANTE/RETRO - VARUS/VALGUS 2		
Short	28	PHA01212
Long	38.5	PHA01214



DIMENSIONAL CHART | PROFEMUR® TAPERED STEM (mm)

CATALOG #	SIZE	A STEM LENGTH	B M/L WIDTH
PHA00409	9	135	30
PHA00410	10	140	31
PHA00411	11	145	32
PHA00412	12	150	33
PHA00413	13	155	33.5
PHA00414	14	160	34
PHA00415	15	165	35
PHA00416	16	170	36.5
PHA00417	17	175	37
PHA00418	18	180	38.5



LINEAGE® Acetabular Cup System

SHELL SIZE	GROUPING	CERAMIC LINER INSIDE DIAMETER	METAL LINER INSIDE DIAMETER	POLYETHYLENE LINER INSIDE DIAMETER
46mm 48mm 50mm	Group 1	28mm	28mm	28mm
52mm 54mm 56mm	Group 2	32mm	32mm	28 & 32mm
58mm 60mm 62mm	Group 3	32mm	32mm	28 & 32mm
64mm 66mm 68mm	Group 4	36mm	36mm	28 & 32mm



CONSERVE® Total with BFH™ Technology

HEAD SIZE	CUP SIZE
36 O.D.	42 O.D.
38 O.D.	44 O.D.
40 O.D.	46 O.D.
42 O.D.	48 O.D.
44 O.D.	50 O.D.
46 O.D.	52 O.D.
48 O.D.	54 O.D.
50 O.D.	56 O.D.
52 O.D.	58 O.D.
54 O.D.	60 O.D.
56 O.D.	62 O.D.
56 O.D.	64 O.D.

APPENDIX B | ORDERING INFORMATION

CATALOG #	DESCRIPTION
PROFEMUR® TAPERED HIP SYSTEM	
WRIGHT EXPRESS® INSTRUMENT KIT PRTB-KIT 1	
PTSB0409	BROACH SIZE 9 STANDARD
PTSB0410	BROACH SIZE 10 STANDARD
PTSB0411	BROACH SIZE 11 STANDARD
PTSB0412	BROACH SIZE 12 STANDARD
PTSB0413	BROACH SIZE 13 STANDARD
PTSB0414	BROACH SIZE 14 STANDARD
PTSB0415	BROACH SIZE 15 STANDARD
PTSB0416	BROACH SIZE 16 STANDARD
PTSB0417	BROACH SIZE 17 STANDARD
PTSB0418	BROACH SIZE 18 STANDARD
PTSR0410	TAPERED REAMER SIZE 9/10
PTSR0412	TAPERED REAMER SIZE 11/12
PTSR0414	TAPERED REAMER SIZE 13/14
PTSR0416	TAPERED REAMER SIZE 15/16
PTSR0418	TAPERED REAMER SIZE 17/18
PTRG-0410	NECK RESECTION GUIDE
WRIGHT EXPRESS® INSTRUMENT KIT PRGI-KIT 1	
APA02121	FEMORAL HEAD TRIAL 28MM SHORT
APA02122	FEMORAL HEAD TRIAL 28MM MEDIUM
APA02123	FEMORAL HEAD TRIAL 28MM LONG
APA02124	FEMORAL HEAD TRIAL 28MM EXTRA LONG
APA02125	FEMORAL HEAD TRIAL 28MM XX-LONG
APA02151	FEMORAL HEAD TRIAL 32MM SHORT
APA02152	FEMORAL HEAD TRIAL 32MM MEDIUM
APA02153	FEMORAL HEAD TRIAL 32MM LONG
APA02154	FEMORAL HEAD TRIAL 32MM X-LONG
APA02142	FEMORAL HEAD TRIAL 36MM SHORT
APA02144	FEMORAL HEAD TRIAL 36MM MEDIUM
APA02146	FEMORAL HEAD TRIAL 36MM LONG
APA02148	FEMORAL HEAD TRIAL 36MM X-LONG
APA08102	PLASTIC TRIAL NECK SHORT STRAIGHT
APA08104	PLASTIC TRIAL NECK LONG STRAIGHT
APA08112	PLASTIC TRIAL NECK A/R VAR/VAL 1 SHORT
APA08114	PLASTIC TRIAL NECK A/R VAR/VAL 1 LONG
APA08122	PLASTIC TRIAL NECK A/R VAR/VAL 2 SHORT
APA08124	PLASTIC TRIAL NECK A/R VAR/VAL 2 LONG
APA08132	PLASTIC TRIAL NECK 8 DEG A/R SHORT
APA08134	PLASTIC TRIAL NECK 8 DEG A/R LONG
APA08142	PLASTIC TRIAL NECK 15 DEG A/R SHORT
APA08144	PLASTIC TRIAL NECK 15 DEG A/R LONG
APA08152	PLASTIC TRIAL NECK VAR/VAL SHORT
APA08154	PLASTIC TRIAL NECK VAR/VAL LONG
PRFS0450	BOX CHISEL
4400F10000	HEAD IMPACTOR
APA04241	STRAIGHT RASP HANDLE (2)
K0001016	T-HANDLE
APA04244	BROACH HANDLE REFERENCE ROD (2)
94009488	STEM IMPACTOR
APA00001	NECK EXTRACTOR
APA00005	NECK EXTRACTOR SPANNER
APA00006	NECK EXTRACTOR TOMMY BAR
APA00003	NECK EXTRACTOR NECK ATTACHMENT
PPG00103	NECK BARREL EXTRACTOR
PPG00104	NECK EXTRACTOR (T-HANDLE)
PP275400	SCREWDRIVER FOR EXTRACTOR
PRFS0462	BROACH EXTRACTOR
PPR67688	STEM EXTRACTOR
PPW36296	SLAPHAMMER
APA01120	NECK GRABBER
PRFS0451	REAMER SLEEVE
APA04750	STARTER REAMER
PRFS0458	HEAD GRABBER
PRFS0459	RT. ANGLE FEMORAL HEAD IMPACTOR
PRFS0461	THREADED STEM INSERTER

CATALOG #	DESCRIPTION
PROFEMUR® TAPERED IMPLANT KIT 6251-KIT I	
PHA00409	SIZE 9 STEM
PHA00410	SIZE 10 STEM
PHA00411	SIZE 11 STEM
PHA00412	SIZE 12 STEM
PHA00413	SIZE 13 STEM
PHA00414	SIZE 14 STEM
PHA00415	SIZE 15 STEM
PHA00416	SIZE 16 STEM
PHA00417	SIZE 17 STEM
PHA00418	SIZE 18 STEM
PROFEMUR® MODULAR NECK IMPLANT KIT 3251-KIT N	
PHA01252	V V SHORT 8°
PHA01254	V V LONG 8°
PHA01242	AR SHORT 15°
PHA01244	AR LONG 15°
PHA01232	AR SHORT 8°
PHA01234	AR LONG 8°
PHA01212	AR/V V2 SHORT
PHA01214	AR/V V2 LONG
PHA01222	AR/V V1 SHORT
PHA01224	AR/V V1 LONG
PHA01202	NEUTRAL SHORT
PHA01204	NEUTRAL LONG
WOODPECKER BROACHING SYSTEM	
WRIGHT EXPRESS® INSTRUMENT KIT 4251 - KT 10	
APA00930	WOODPECKER
APA00931	HOSE ATTACHMENT
APA00941	CASE
PPA30091	BROACH HANDLE



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