stryker®

Orthopaedics

Scorpio® TS
Single Axis Revision Knee System

Scorpio Total Stabilizer Revision Knee System Surgical Protocol

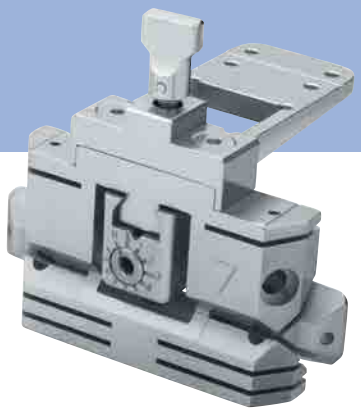
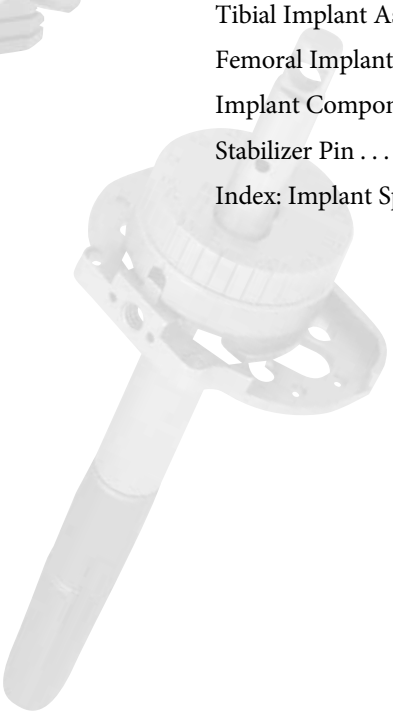


Table of Contents



Scorpio Total Stabilizer Revision Knee System Surgical Protocol

Scorpio TS Revision Knee System Surgical Protocol

Overview

Scorpio TS is a unique, comprehensive Revision TKA system with intra-medullary based instrumentation for the tibia and femur. The system features cutting guides with a wide array of augment options, offset stem capabilities, and anatomic referencing. Scorpio TS provides the surgeon with solutions for a broad spectrum of revision scenarios by creating a reproducible means to establish the joint line even in complex cases with bone and ligament deficiencies.

The Scorpio TS instruments are designed to empower the surgeon to accurately restore joint line in cases with severe bone loss and anatomical defects. Based on cadaveric studies, Scorpio TS utilizes three anatomic landmarks as reference guides: the medial epicondyles of the femur, the top of the tibial tubercle and the inferior pole of the patella. The distal resection guide of the femur was crafted with a scribed line "ME" indicating correct positioning for resection. This line represents the distance from the epicondyles to joint line, thus ensuring joint line is restored. Included in the instrument set is a joint line scale that takes advantage of average distances from the top of the tibial tubercle (32mm) to joint line and the inferior pole of the patella (14mm in full extension) to joint line. This ruler allows a quick and easy check for joint line position.

Acknowledgements

Stryker would like to thank the following orthopaedic surgeons for their help in developing the Scorpio Knee System:

Peter Bonutti, MD
Ass't. Professor
Effingham Illinois University
Ass't. Clinical Professor
University of Arkansas
Little Rock, Arkansas

Frank Kolisek, MD
Associate Clinical Professor
Department of Orthopaedic Surgery
Indiana University School of Medicine,
Indianapolis, IN.
Medical Director
for Orthopaedic-Neuroscience service line
St. Francis Hospital & Health Centers,
Indianapolis, IN.

Ormonde Mahoney, MD
Associate Clinical Professor of Orthopaedics
Medical College of Georgia
Arthur Malkani, MD
Ass't. Clinical Professor & Chief
of Adult Reconstruction
University of Louisville, Louisville, KY

David Markel, MD
Clinical Assistant Professor
Wayne State University
Detroit, MI

Michael A. Masini, MD
Clinical Instructor in Orthopaedic Surgery
at the University of Michigan,
Ann Arbor Michigan.

Michael Mason, MD
Ass't. Professor in Orthopaedic Surgery
Boston University School of medicine
Boston, MA
Clinical Instructor in Orthopaedic Surgery
Harvard Medical School
Boston, MA

Indications

- Painful, disabling joint disease of the knee resulting from: degenerative arthritis, rheumatoid arthritis or post-traumatic arthritis.
- Post-traumatic loss of knee joint configuration and function.
- Moderate varus, valgus, or flexion deformity in which the ligamentous structures can be returned to adequate function and stability.
- Revision of previous unsuccessful knee replacement or other procedure.

Additional Indications for Posterior Stabilized Components:

- Ligamentous instability requiring implant bearing surface geometries with increased constraint.
- Absent or non-functioning posterior cruciate ligament.

For TS Components Only: Severe anteroposterior and medial/lateral instability of the knee joint.

Indications for Bone Augmentation:

- Painful, disabling joint disease of the knee secondary to: degenerative arthritis, rheumatoid arthritis, or post-traumatic arthritis, complicated by the presence of bone loss.
- Salvage of previous unsuccessful total knee replacement or other surgical procedure, accompanied by bone loss.

Contraindications

- Any active or suspected latent infection in or about the knee joint.
- Any mental or neuromuscular disorder which would create an unacceptable risk of prosthesis instability, prosthesis fixation failure, or complications in postoperative care.
- Bone stock compromised by disease, infection or prior implantation, which cannot provide adequate support and/or fixation to the prosthesis.
- Skeletal immaturity.
- Severe instability of the knee joint secondary to the absence of collateral ligament integrity and function.
- Obesity. An overweight or obese patient can produce loads on the prosthesis which can lead to failure of the fixation of the device or to failure of the device itself.

Additional Contraindication for Bone Augmentation:

- Bone stock which is sufficient for the adequate fixation of the total knee component without augmentation

See package insert for warnings precautions, adverse effects, information for patients, and other essential product information.

Before using Scorpio TS instrumentation, verify:

- Instruments have been properly disassembled prior to cleaning and sterilization;
- Instruments have been properly assembled post-sterilization;
- Instruments have maintained design integrity; and,
- Proper size configurations are available.

For Instructions for Cleaning, Sterilization, Inspection and Maintenance of Orthopaedic Medical Devices, refer to LSTPI-B.

Component Removal

When removing the components to be revised, great care must be taken to preserve as much of the remaining bone stock as possible and to avoid the risk of fracture of the residual bone. Through the use of small flexible osteotomes, saws, and high-speed burring instruments, bone preservation can usually be achieved.

Tibial Canal Preparation

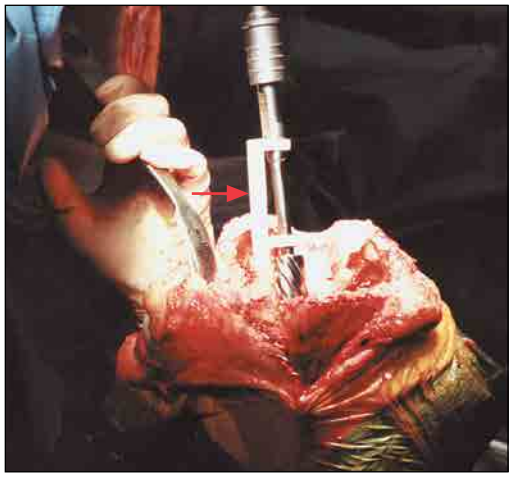


Figure 1

- Ream with 3/8" starter drill if access to canal is not present
- Ream progressively, by hand, until cortical contact is achieved
- Proper reamer depth is achieved with the use of depth gauges (***Figure 1***)

Note: If reamed stem diameter is less than 15mm use tibial offset reamer to prepare for implant boss. Ream to depth of bone groove on reamer's shaft (Figure 1A).

Note: Depth gauges account for length of stem, offset adapter, and implant boss.

Note: It is strongly recommended that IM Canal reaming be performed manually to avoid bone perforation and/or fracture. Manual reaming should allow for tactile feedback and allow the surgeon to achieve proper fill of the canal without over-reaming. In selected cases, if uncertainty exists, intraoperative X-rays may be considered.

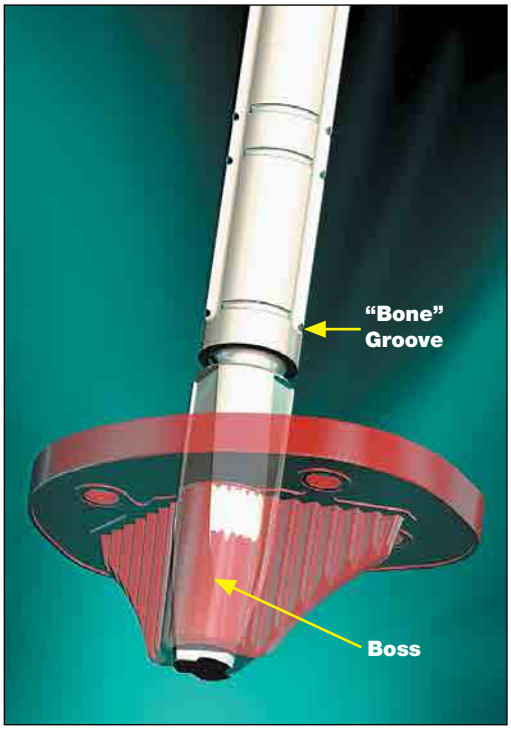


Figure 1A

Proximal Tibial Resection

Assemble appropriate stem trial to resection guide tower (**Figure 2**)

- Attach appropriate size stem (based on ream) to resection guide tower
- Attach reference collar to resection guide tower assembly
- Attach support arm bracket to resection guide tower
- Secure left or right tibial resection guide to support arm bracket by tightening locking screw

Hint: *"Consider using the 8mm x 255mm Intramedullary rod for the cutting and aligning portion of the procedure. This will ensure that proper IM alignment is obtained. There is no problem implanting a shorter stem." Dr. Markel*

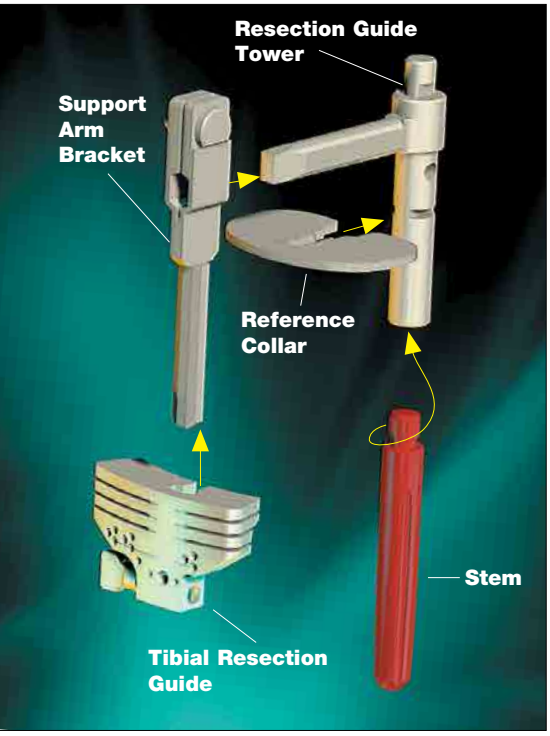


Figure 2

- Assemble bracket assembly to resection guide tower assembly

Hint: *"If an offset stem appears necessary, tibial augment resection should be delayed and performed off the tibial template." Dr. Masini (refer to tibial augment preparation on pages 3 and 5)*

Hint: *"Stem trial is .5mm smaller than the implant. In poor quality bone it may be necessary to up-size the implant stem." Drs. Mahoney & Masini.*

Insert assembly into canal

- Secure resection guide with two 1/8" pins, using the "0" drill holes (**Figure 3**)
- Loosen locking screw of tibial resection guide, remove resection guide tower assembly from canal

Hint: *Tibial resection can be done with the entire guide tower in place when bone stock is poor*

Note: Slap hammer can be inserted into the hole on the resection guide tower to aid in extraction

- Slide cutting guide to contact the tibia
- Stabilize by inserting a pin into the "X" hole
- Resect tibia (a cut in the neutral slot will be 2mm below the reference collar if the resection guide is up against the stop on the support arm assembly) (**Figure 4**)

Note: This is a 0° (A/P) cut. 4° slope is built into the insert

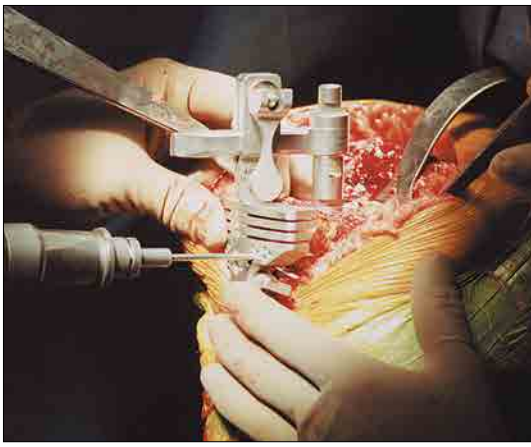


Figure 3

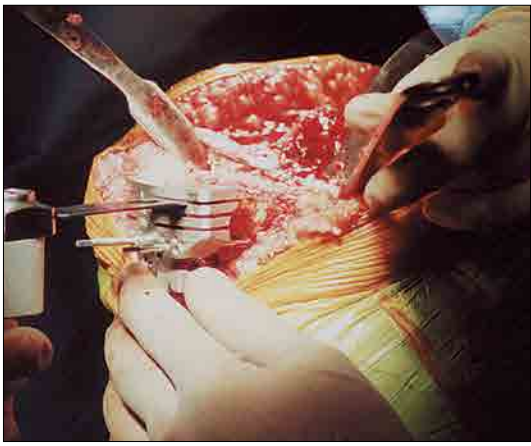


Figure 4

Tibial Augment Preparation without Offset

- 5mm and 10mm augment cuts can be made with the tibial resection guide (**Figure 5**)
- Tibial wedge cuts are made by assembling the tibial wedge cutting guide to support arm bracket (**Figure 5A**)

Hint: *"If you recognize that a full wedge is necessary it is best not to pin the regular cutting guide as the pins are in a different location." Dr. Masini*

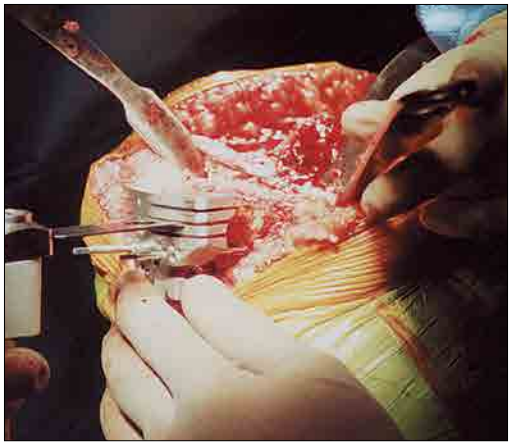


Figure 5

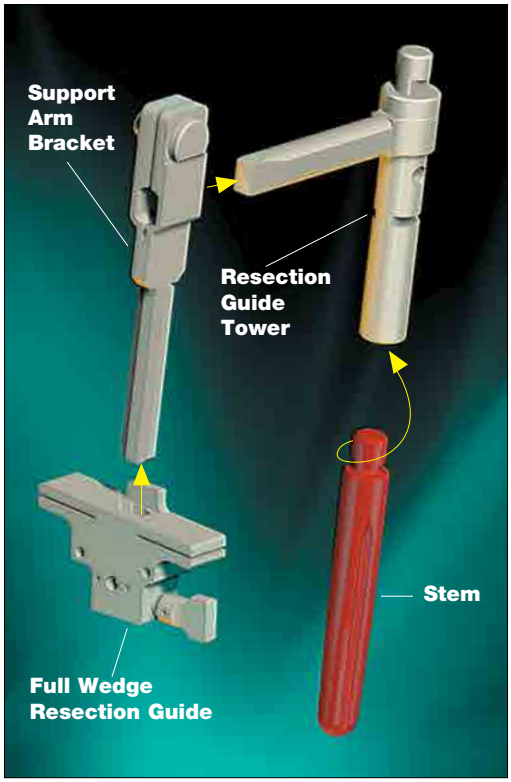


Figure 5A

Tibial Sizing

- Assemble stem trial to trial stem extender shaft and insert into canal until top of large diameter is level with resection (**Figure 6**)
- Position the appropriate sized tibial template for optimal coverage of the tibial plateau
- Visually assess the position of the trial stem extender shaft and the center of the tibial template
- If offsetting is needed select the appropriate offset bushing (4mm, 6mm or 8mm) to maximize proximal tibial coverage

Note: ***Available options for instrumented offsetting are 4mm, 6mm, and 8mm***

Slide the offset bushing over the trial stem extender shaft and seat in the offset positioning guide (**Figure 6A**)

- Rotate the bushing, moving the tibial template relative to the stem to determine optimal coverage (**Figure 7**)
- Record reading
- Pin tibial template
- Remove stem trial with trial stem extender shaft, and offset bushing

Hint: *Shaft on slap hammer can be inserted into the hole on the trial stem extender shaft to aid in extraction*

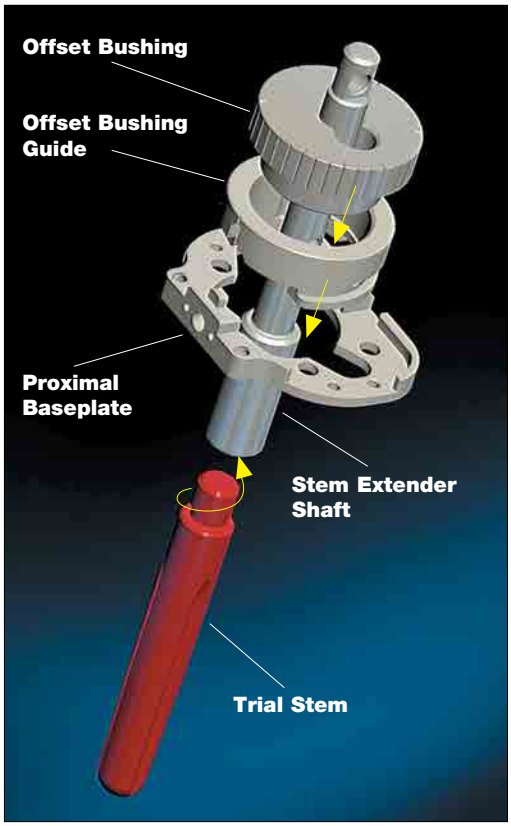


Figure 6

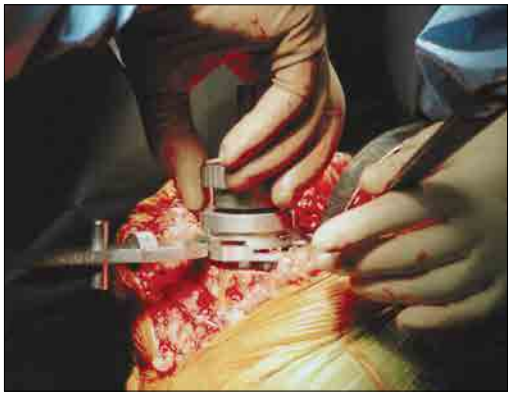


Figure 6A

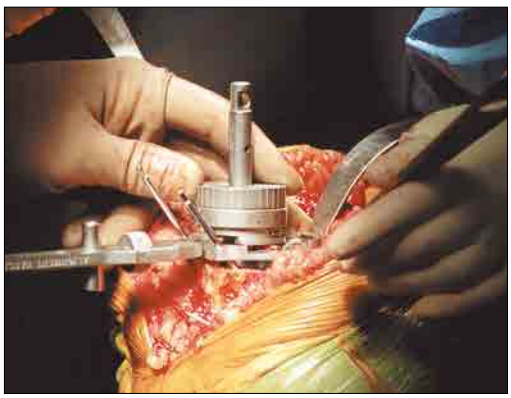


Figure 7

- Seat Boss reamer guide in the proximal tibial baseplate
- Insert the tibial offset reamer into the boss reamer guide and ream to the appropriate depth (reference tibial size as indicated by markings on reamer) (**Figure 8**)

Hint: *It is common for the offset reamer to not make bone contact in severe revision scenarios.*

- Remove the boss reamer guide and tibial offset reamer
- Assemble the appropriate tibial keel punch with punch tower and handles

Hint: *Allow for augmentation prior to doing keel punch (***see below***)*

Note: ***Punch needs to be back loaded through the exit port of the punch tower***

Hint: *"If sclerotic bone is present, consider using 1/8" drill bit, osteotome, or sagittal saw as preliminary prep for punching."*
Drs. Mahoney & Masini

- Assemble punch tower assembly to the tibial template and punch to the final depth, employing progressive punching if required (**Figure 9**)

Hint: *It is very important to ensure all cement is removed prior to punching*

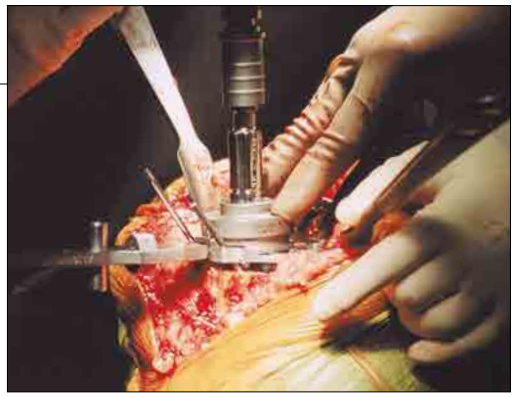


Figure 8

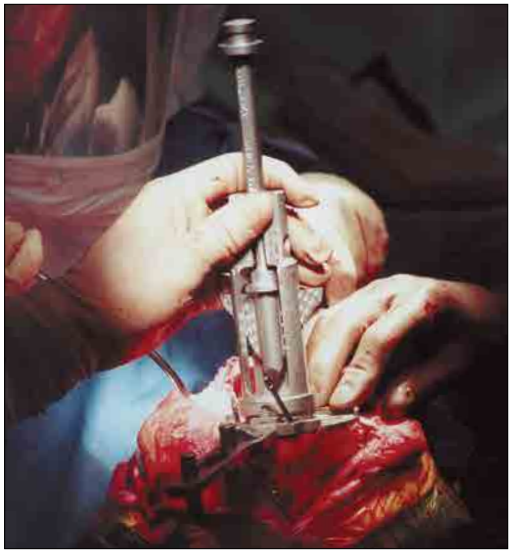


Figure 9

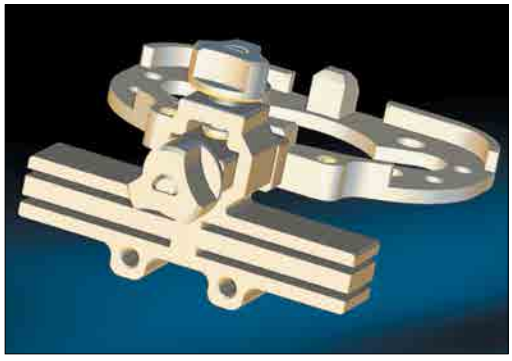


Figure 10

Tibial Augment Prep After Offsetting

- Prior to keel punching, assess the need for augmentation
- Assemble 5 & 10 mm cutting guide to tibial template and make necessary resections or assemble 5 degree tibial wedge cutting guide to tibial template and make necessary resection

Femoral Canal Preparation

- See Tibial Canal Preparation on Page 1

Distal Femoral Resection

- Assemble appropriate stem trial to resection guide tower
- Assemble distal femoral resection guide to support arm bracket by tightening locking screw
- Assemble bracket assembly to resection guide tower assembly (**Figure 11**)
- Insert assembly into canal and align M/E scribe line on distal resection guide to medial epicondyle (**Figure 12**)
- Secure resection guide with two 1/8" pins, using the "0" drill holes
- Loosen locking screw of femoral resection guide, remove resection guide tower assembly from canal
- Slide cutting guide on pins to contact the anterior femur
- Stabilize by inserting a pin into the "X" hole
- Resect distal femur (Neutral slot is a 2mm clean up cut)
- Size femur with either femoral sizing templates, or femoral cutting guide (Scribe lines on medial & lateral sides of cutting guide indicates M/L width of implant. Scribe line on anterior tab indicates anterior flange location on the implant.) (**Figure 13**)

Note: ***Markings on sizing template help to predetermine if offset will be required***

Hint: *"Implant removed can be helpful in sizing in cases of severe bone loss." Dr. Masini*

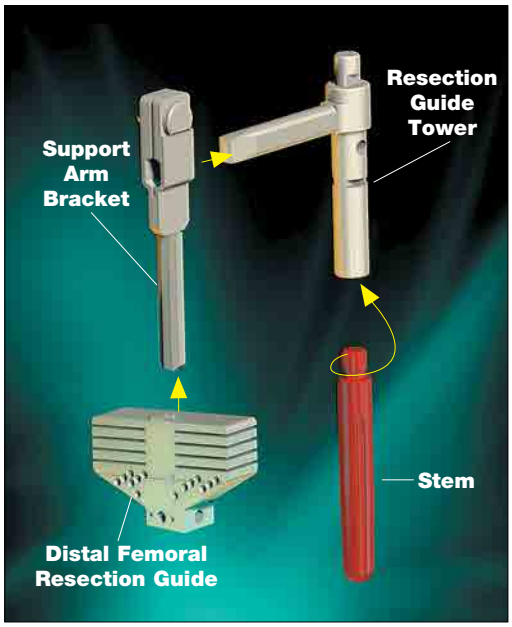


Figure 11

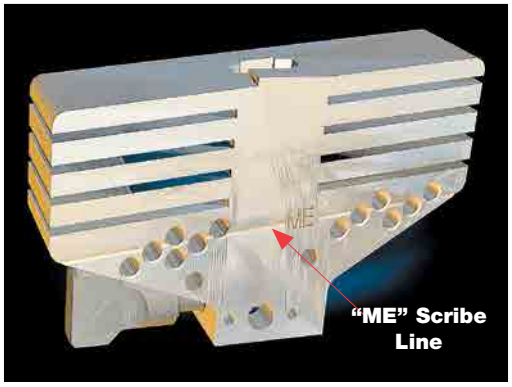


Figure 12

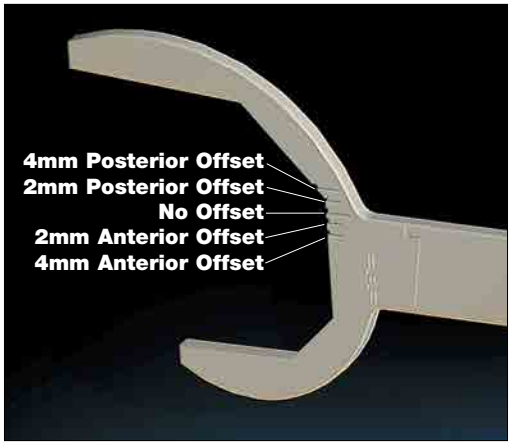


Figure 13

Distal Femoral Augmentation Prep

- 5mm, 10mm and 15mm distal augment cuts can be made with the femoral resection guide (**Figure 14**)

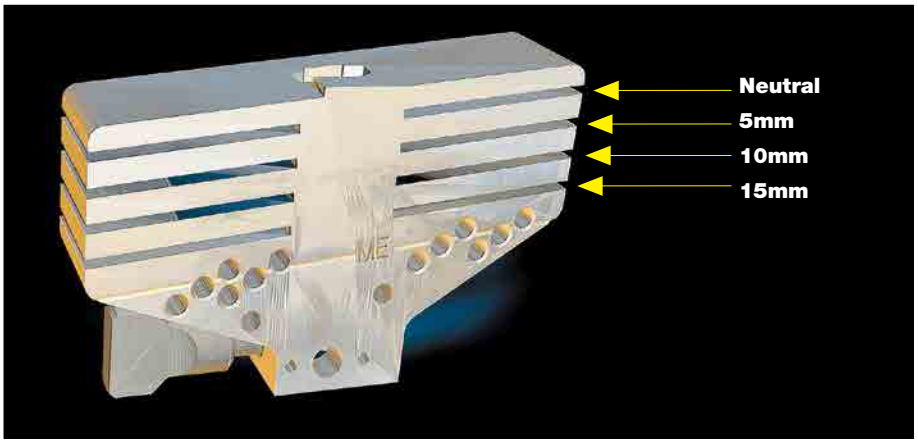


Figure 14

Flexion and Extension Gap Assessment

- After completing the distal femoral resection, the balance and alignment of the flexion and extension gaps can be evaluated through the use of Gap spacer blocks. (**Figure 15**)
- Spacer blocks are available in multiple thicknesses that correspond to the combined thicknesses of the tibial baseplate, polyethylene insert, and the femoral condyles.

Note: ***If any augment cuts were made on the distal femur or proximal tibia, Modular half spacers must be attached to the Gap Spacer Blocks (*****Figure 16*****)***

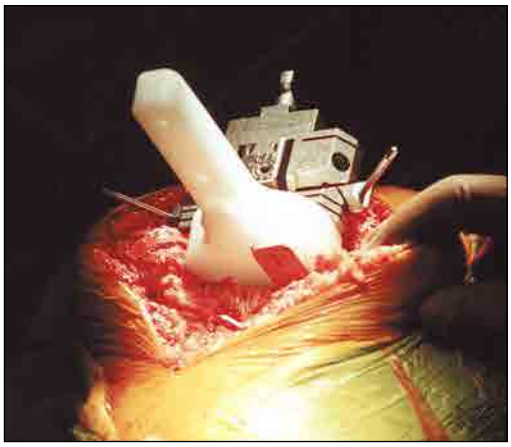


Figure 15

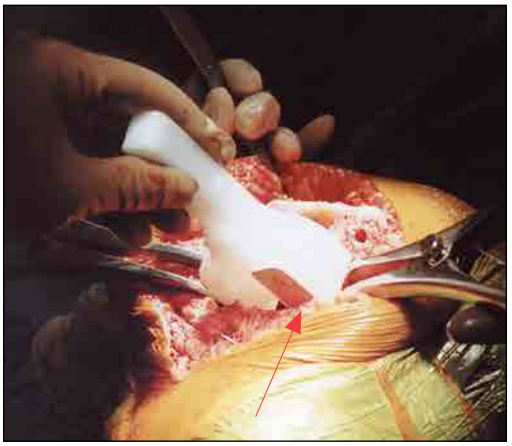


Figure 16

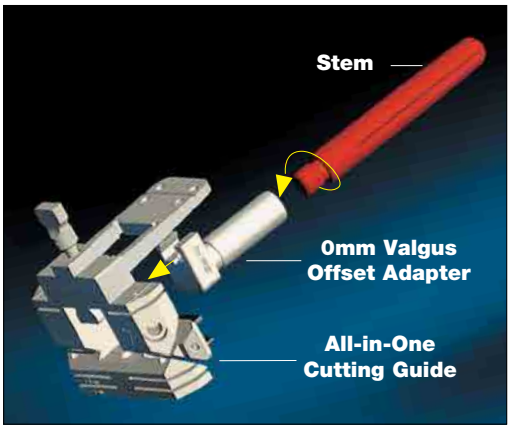


Figure 17

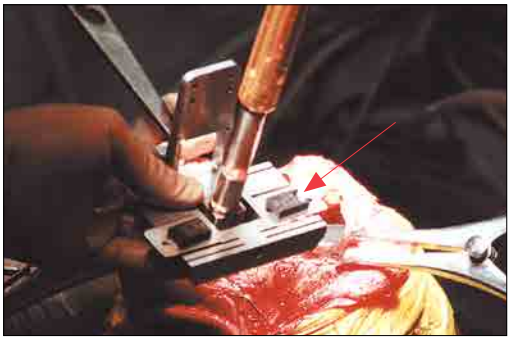


Figure 18

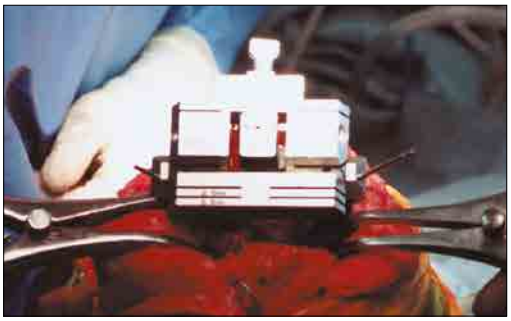


Figure 19

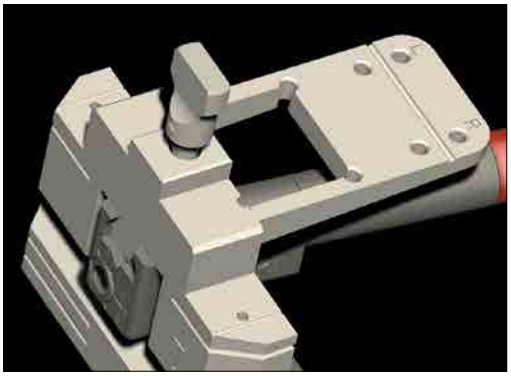


Figure 19A

Anterior, Posterior, & Chamfer Cuts with no Offset

- Assemble appropriate stem trial to the left or right 0mm-offset valgus adapter and assemble to appropriate size femoral all-in-one cutting guide (**Figure 17**)

Note: ***Options available for instrumented offsetting are 2mm and 4mm***

- If distal augment cuts were made, assemble the corresponding spacer blocks to femoral cutting guide (**Figure 18**)

Hint: *"If the augment blocks are not positioned correctly the pins will not pass through." Dr Kolisek*

- If reamed stem diameter is less than 15mm use tibial offset reamer to prepare for implant boss
- Ream with tibial offset reamer to the depth of the "Bone" groove on the reamer shaft
- Determine external rotation by using the medial & lateral epicondyles as a reference to the medial & lateral tabs on the all-in-one cutting guide
- Pin femoral cutting guide using holes on the M/L tabs and the appropriate hole on the anterior tab (**Figure 19**)
- Perform femoral cuts

Note: ***Posterior resection is an uncaptured cut made on the exposed posterior surface of the cutting guide. 5mm & 10mm are augment cuts and are captured***

- Using a narrow saw blade, make medial & lateral cuts for the stabilizer box (cut should go through posterior femur)

Hint: *"Slotted cuts are easier with a double-edged ("Insall") reciprocating blade." Dr. Barnes*

- The proximal box cut is stopped by stem trial (score bone with saw for marking purpose then remove femoral cutting guide and complete cut) (**Figure 19A**)

Anterior, Posterior, & Chamfer Cuts with Offset

- Assemble stem trial to femoral offset reamer (**Figure 20**)
- Ream to "Bone" mark on femoral offset reamer (**Figure 21**)
- Assemble appropriate stem trial to the left or right appropriate offset valgus adapter and assemble to appropriate femoral cutting guide

Note: Options available for instrumented offsetting are 2mm and 4mm

- If distal augment cuts were made, assemble the corresponding spacer blocks to femoral cutting guide
- Insert blade runner into anterior slot (to prevent notching)
- Using 4mm ball hex driver position femoral cutting guide for optimal placement of the femur with respect to the canal (Figure 22)
- Record offset value from offset adapter
- Determine external rotation by using the medial & lateral epicondyles
- Pin femoral cutting guide using holes on sides and anterior tab
- Perform femoral cuts

Note: ***Posterior resection is a un-captured cut and is made on the exposed posterior surface of the cutting guide. 5mm & 10mm posterior augment cuts are captured***

- Using a narrow saw blade, make side cuts for the stabilizer box (**see Figure 19A opposite**)
- The top cut is stopped by stem trial
- Remove femoral cutting guide and complete top cut

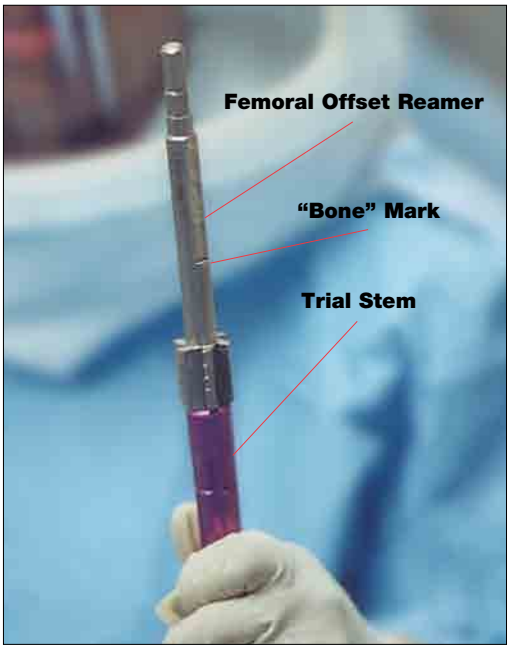


Figure 20

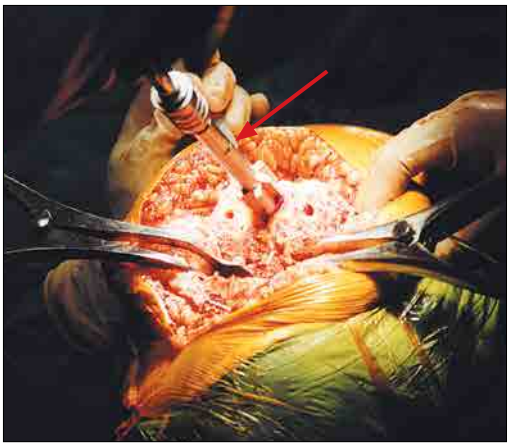


Figure 21

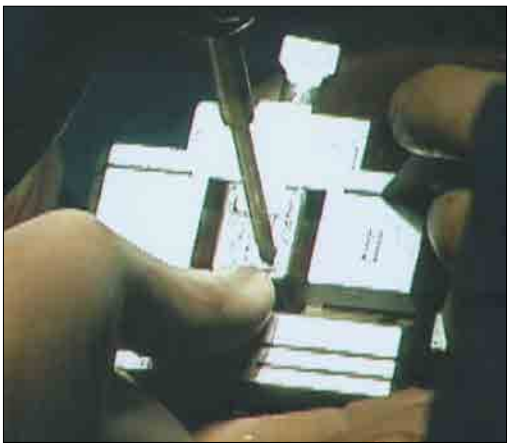


Figure 22

Trial Reduction

Femoral Component (Figure 23)

The trial femoral component is assembled with required augments and stems, corresponding to the completed femoral bone preparation. The options include:

- Medial and/or lateral distal spacers (5mm,10mm, 15mm)
- Medial and/or lateral posterior spacers (5mm, 10mm)
- Intramedullary Stems in various lengths, diameters, and offsets.

Note: ***Options available for instrumented offsetting are 2mm and 4mm (refer to implant assembly)***

Trial augments snap into trial component

Figure 23

Tibial Component (Figure 24)

Assemble the trial component corresponding to the tibial preparation. The implant options are:

- Half 5mm, or 10mm blocks
- Full 10mm Block
- 5 degree full wedge

Trial augments snap into trial component

Figure 24

Insert Trials

- Trial inserts snap on to tibial trial baseplate

Note: ***When Mixing a size #7 femur and #5 tibia or a #11 femur and a #9 tibia, the "bridging inserts" should be used (see*** **Compatibility Chart** ***below)***

Note: ***If varus/valgus constraint is not desired the Scorpio PS insert will articulate with the Scorpio TS Femur***

Scorpio TS Implant Compatibility Chart

("XX" Denotes insert thickness)

		Tibial Baseplates*				
		77-4003	**77-4005**	**77-4007**	**77-4009**	**77-4011**
Femoral Components	**76-4103**	72-4-03XX	72-4-05XX			
	76-4105	72-4-03XX	72-4-05XX	*		
	76-4107		72-4-75XX (CROSSOVER)	72-4-07XX	72-4-09XX	
	76-4109			72-4-07XX	72-4-09XX	*
	76-4111				72-4-19XX (CROSSOVER)	72-4-11XX
	76-4113					72-4-11XX

*Scorpio PS Inserts may be used.

Tibial Implant Assembly

Note: ***The full wedge is the only augment that requires cementing***

- Assemble tibial augments necessary with the 2.5mm hex driver to the tibial baseplate implant. Hand tighten only

Note: ***If tibial stem/offset is to be used remove keel end-cap with 5mm hex wrench***

Assemble stem to offset adapter if needed. Torque to 120-180lbs (not required for trialing). Use offset counter wrench and appropriate adapter to the torque wrench

- Ensure jam nut is up against the offset adapter (**Figure 25**)
- Assemble stem and offset adapter to tibial baseplate
- Put tibial baseplate on table with stem pointing towards ceiling
- Bring offset fixture over the stem and secure
- With counter wrench in left hand slide pin all the way to "STD" markings on wrench (align scribe line on wrench with scribe line on offset adapter)
- Insert pin into hole determined by instrumentation (**see page 4**)
- Rotate offset adapter counterclockwise until the hash marks are aligned and offset adapter body fits into wrench
- Hand tighten the jam nut against the tibial baseplate (Not the offset)
- Lock in place with jam nut wrench. (Pull towards you) Torque to 120-180lbs (not required for trialing) (**Figure 26**)

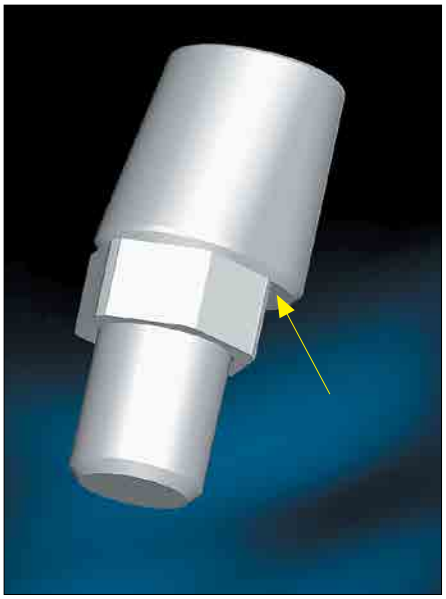


Figure 25

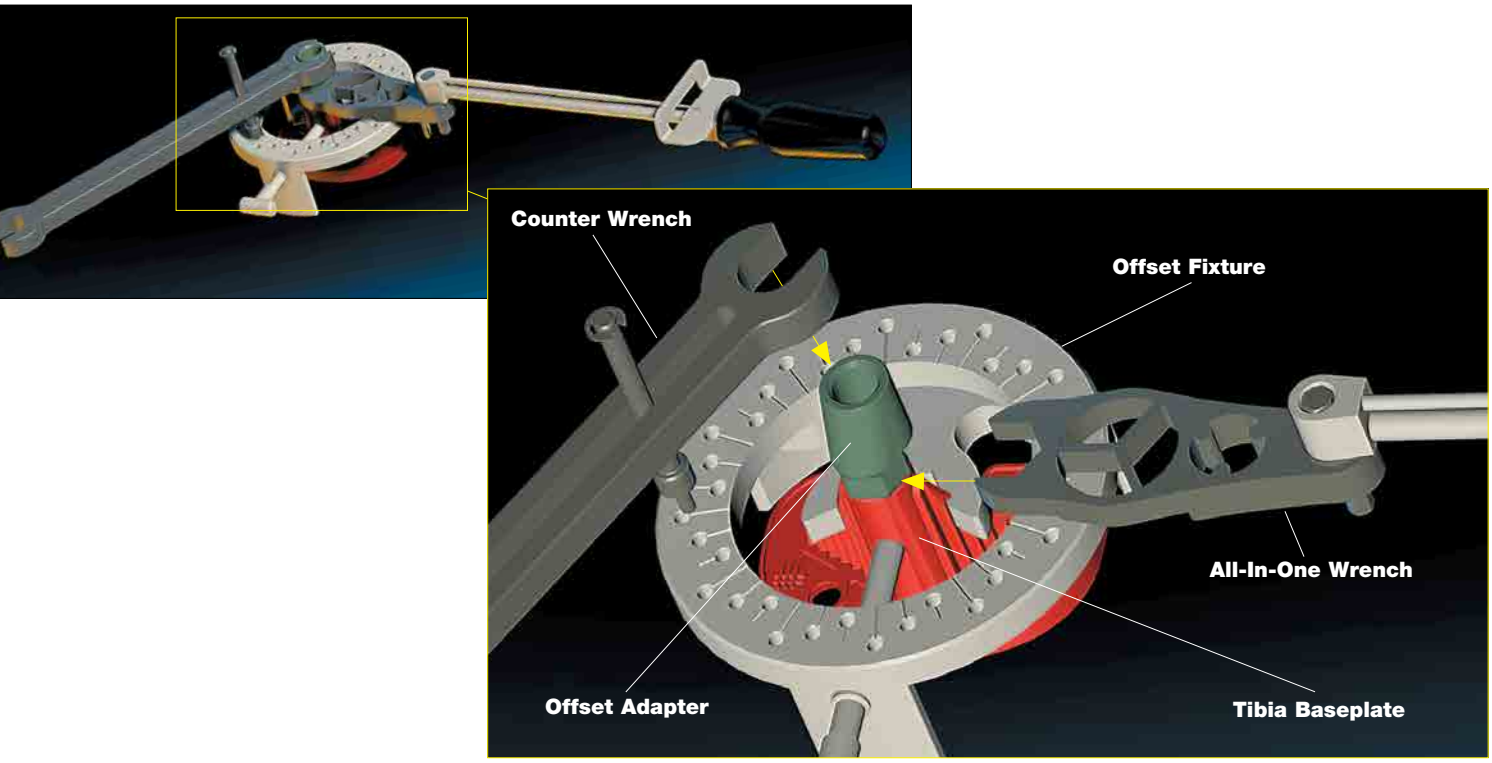


Figure 26

Femoral Implant Assembly

Note: ***If femoral stem/offset is to be used remove stem end-cap with 4mm hex wrench Assemble stem to offset adapter if needed.***

- Ensure jam nut is up against the offset adapter (**Figure 25**)
- Thread stem/offset assembly into femoral component completely
- Align hash marks on offset adapter trial to hash marks on the box of the femoral component (**Figure 27**)
- Hand tighten the jam nut against the femoral component (not the stem) no more than one complete turn
- Insert femoral counter wrench between anterior flange and the femoral boss (**Figure 28**)
- Lock in place with jam nut wrench. Use femoral counter wrench an jam nut wrench to torque to 120-180lbs (not required for trialing)
- Assemble femoral augments as necessary by utilizing the 4-mm ball hex driver. Hand tighten only (**Figure 29**)

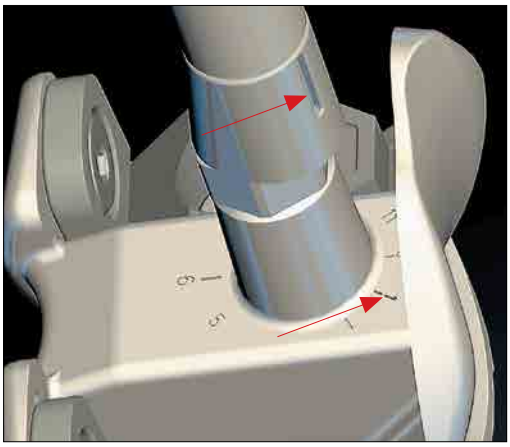


Figure 27

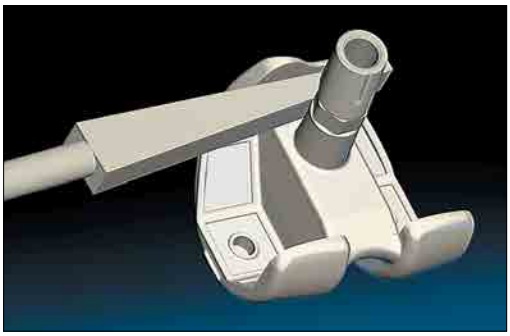


Figure 28

Figure 29

Implant Components

- Implant tibial component by assembling to the tibial impactor/extractor
- Implant femoral component by assembling the femur to the femoral impactor/extractor
- Implant the tibial insert into the tibial tray by tapping the insert with the tibial impactor and a mallet

Figure 30

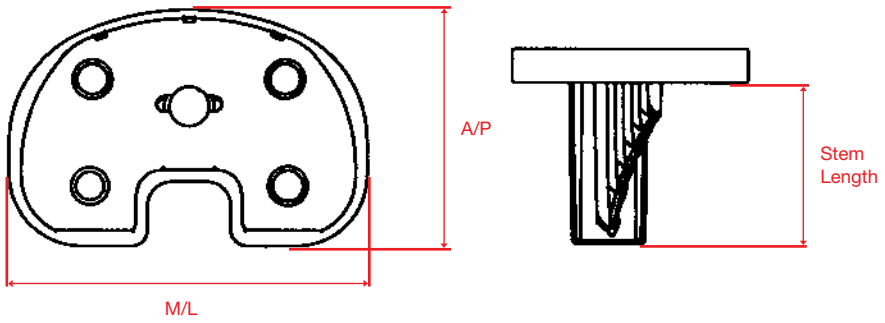
Stabilizer Pin

- Insert locking pin into insert post "barbed" end up (**Figure 30**)
- Tap down below anterior surface

Note: ***Stabilizer pin is packaged with the insert***

Scorpio TS Revision Knee System Technical Information

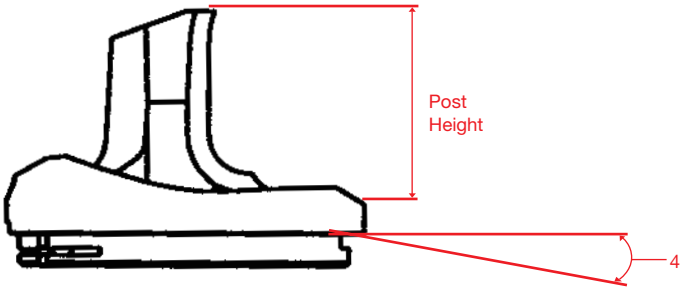
Baseplate



Size	A/P (mm)	M/L (mm)	*Stem Length (mm)
3	40	61	35
5	44	66	35
7	47	71	37
9	51	77	37
11	54	82	43
13	58	88	43

*With end cap

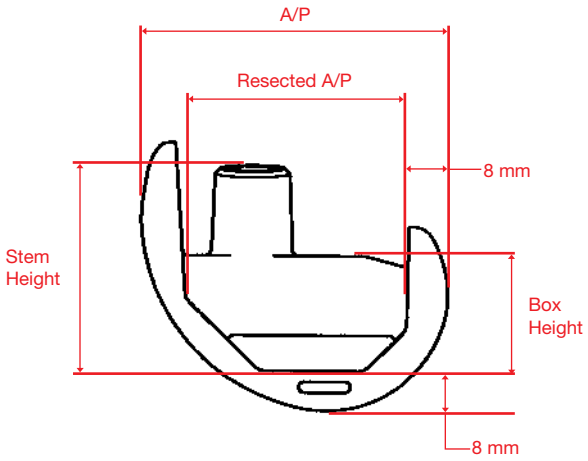
Insert

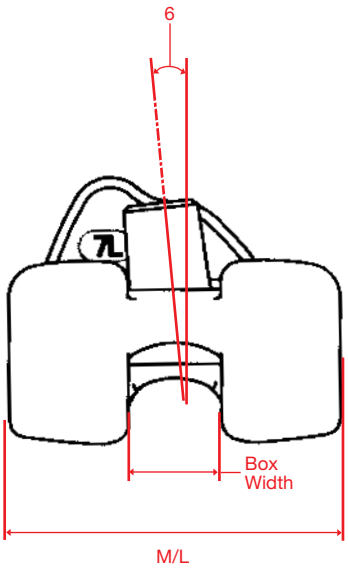


Size	3, 5, 7F/5T, 7, 9, 11F/9T, 11, 13	
Thickness (mm)	10, 12, 14, 16, 18, 21, 24	
Post Height/Width	3, 5	23 mm/16 mm
	7F/5T, 7, 9	27 mm/18 mm
	11F/9T, 11, 13	29 mm/20 mm
*Jump Height	21 mm	
Varus / Valgus Constraint	± 2°	
Internal / External Constraint	± 10°	
Posterior Slope	4°	
Cam Engagement	60°	

* The distance the femoral component must travel to clear the post in 90° of flexion

Femur

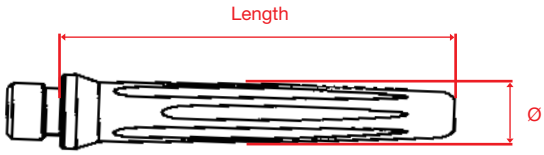




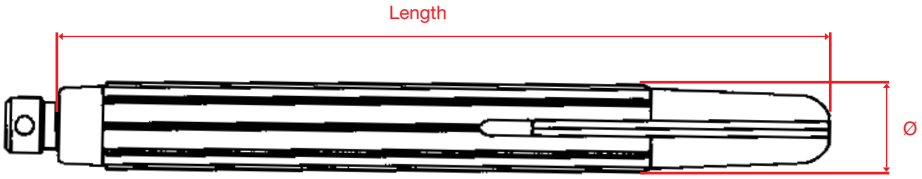
Size	A/P Medial (mm)	A/P Lateral (mm)	M/L (mm)	Resected A/P (mm)	Box Height (mm)	Box Width (mm)	*Stem Height (mm)
3	52	54	56	35	20	17	42
5	56	58	61	39	20	17	42
7	60	62	66	44	23	19	46
9	66	68	71	49	23	19	46
11	70	72	76	53	25	21	48
13	74	76	81	58	25	21	48

*With end cap

Stems Titanium Fluted and Cobalt Chrome



Cobalt Chrome Stem (80 mm shown)



Titanium Fluted Stem (155 mm shown)

80 mm Length	10 mm Ø, 11 mm Ø, 12 mm Ø, 13 mm Ø, 14 mm Ø, 15 mm Ø, 16 mm Ø, 17 mm Ø, 18 mm Ø, 19 mm Ø, 21 mm Ø, 23 mm Ø
155 mm Length	10 mm Ø, 11 mm Ø, 12 mm Ø, 13 mm Ø, 14 mm Ø, 15 mm Ø, 16 mm Ø, 17 mm Ø, 18 mm Ø, 19 mm Ø, 21 mm Ø, 23 mm Ø

- Tri-slots available in Titanium fluted stems only – 14 mm through 23 mm diameters in 155 mm length.
- Offset adapters mate with all stems, Scorpio TS baseplates, and Scorpio TS femoral components. Offset adapters are available in 2 mm, 4 mm, 6 mm, and 8 mm configurations.

stryker®

Reconstructive

Hips

Knees

Trauma & Extremities

Foot & Ankle

Joint Preservation

Orthobiologics & Biosurgery

MedSurg

Power Tools & Surgical Accessories

Computer Assisted Surgery

Endoscopic Surgical Solutions

Integrated Communications

Beds, Stretchers & EMS

Reprocessing & Remanufacturing

Neurotechnology & Spine

Craniomaxillofacial

Interventional Spine

Neurosurgical, Spine & ENT

Neurovascular

Spinal Implants

325 Corporate Drive
Mahwah, NJ 07430
t: 201 831 5000

www.stryker.com

A surgeon must always rely on his or her own professional clinical judgment when deciding whether to use a particular product when treating a particular patient. Stryker does not dispense medical advice and recommends that surgeons be trained in the use of any particular product before using it in surgery.

The information presented is intended to demonstrate the breadth of Stryker product offerings. A surgeon must always refer to the package insert, product label and/or instructions for use before using any Stryker product. The products depicted are CE marked according to the Medical Device Directive 93/42/EEC. Products may not be available in all markets because product availability is subject to the regulatory and/or medical practices in individual markets. Please contact your Stryker representative if you have questions about the availability of Stryker products in your area.

SCORPI-SP-4 11/14 Printed in USA