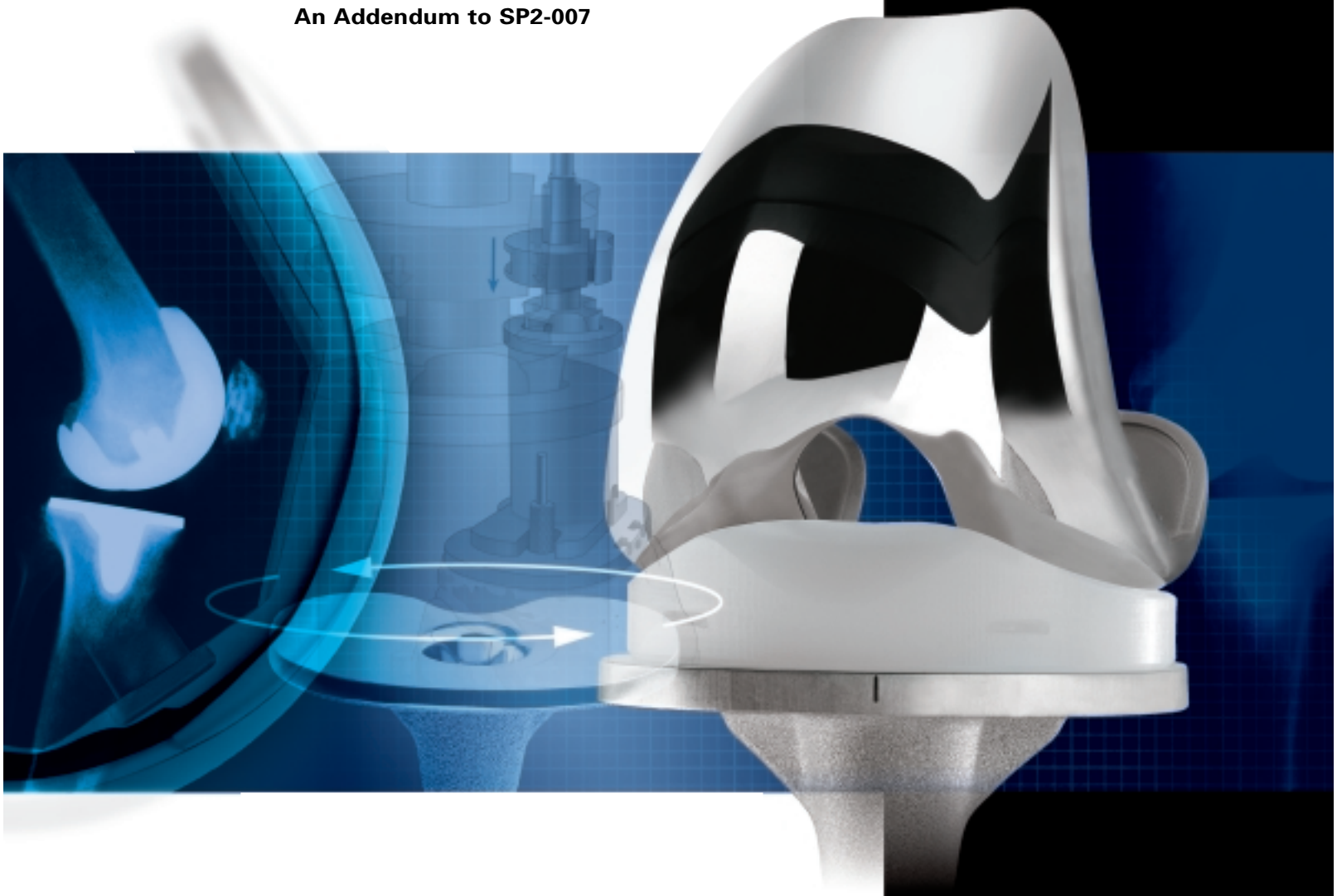
SURGICAL TECHNIQUE

P.F.C.® Sigma Rotating Platform Knee System

with M.B.T. Tray

An Addendum to SP2-007



PRIMARY PROCEDURE
WITH A CURVED OR
POSTERIOR STABILIZED
IMPLANT

DePuy
a Johnson & Johnson company

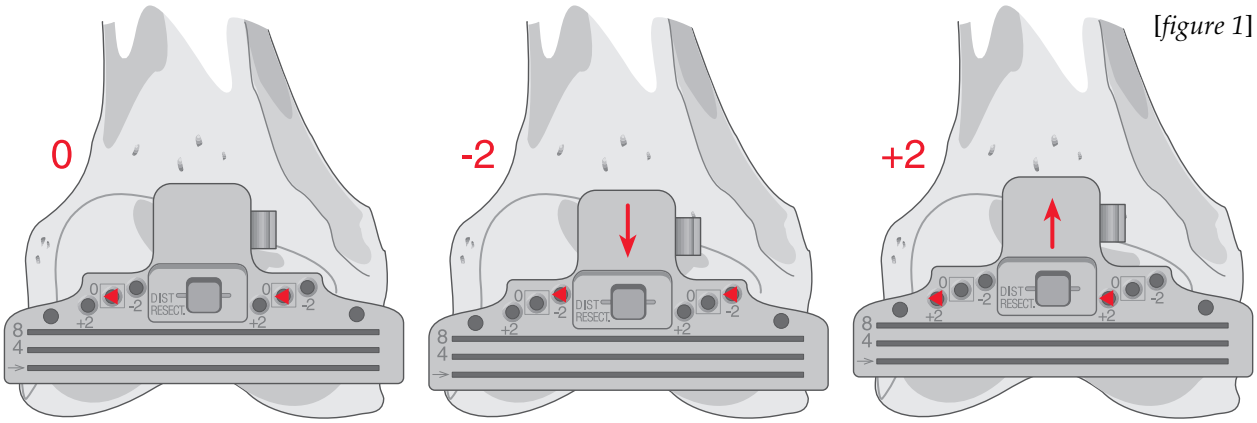
As part of the Specialist 2 System, several approaches to surgery are available. Either prepare the femur first then proceed to the tibia, or prepare the tibia first and proceed to the femur. Regardless, it is important for the ligaments to be balanced correctly. This can be assessed by using spacer blocks, laminar spreaders or the trial components themselves. This technique will begin with the distal femoral cut first, followed by the proximal tibia cut to balance the extension gap.

DISTAL FEMORAL CUT

Note: Distal femoral resection or proximal tibial resection can be done in any order.

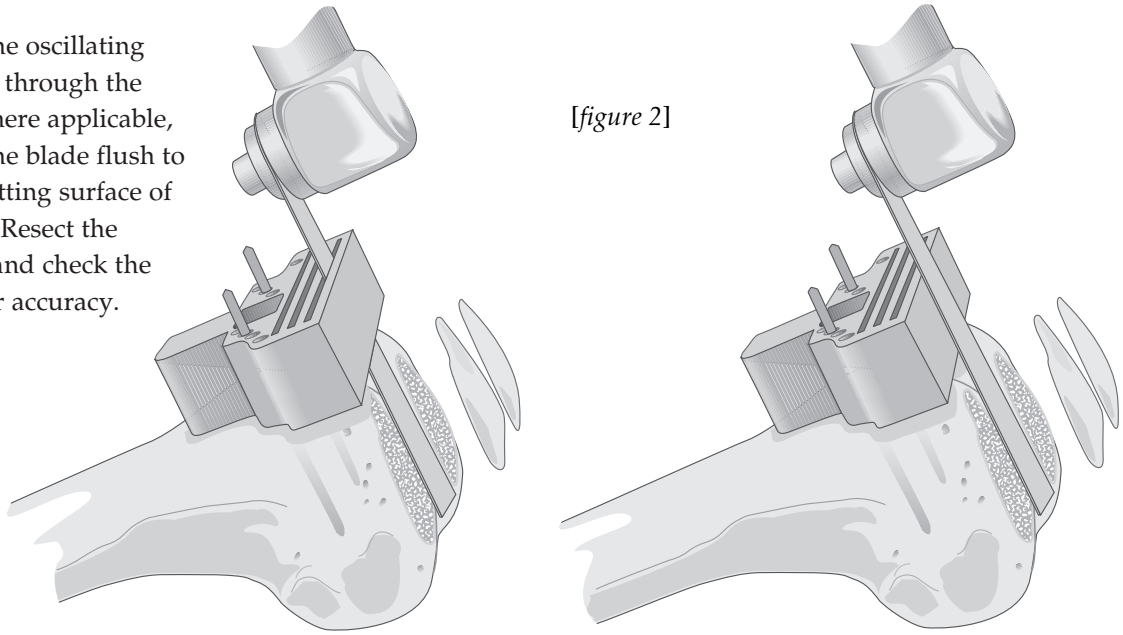
Resect the distal femur using the chosen resection level. The distal thickness of the Sigma femoral implant is 9 mm (10 mm on size 6).

The holes on the block are designated –2, 0 and +2, indicating in millimeters the amount of bone resection each will yield supplemental to that indicated on the calibrated outrigger. [*fig. 1*]



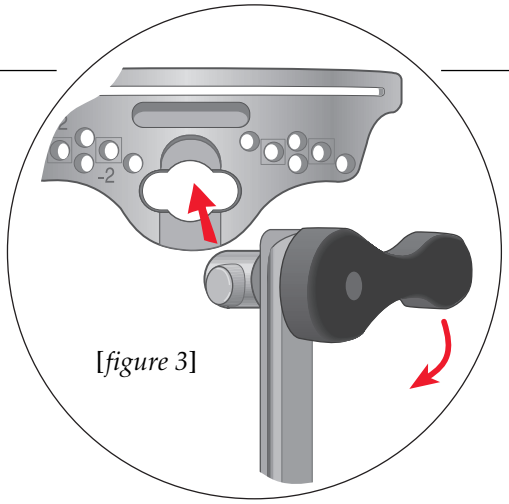
[*figure 1*]

Position the oscillating saw blade through the slot or, where applicable, position the blade flush to the top cutting surface of the block. Resect the condyles and check the surface for accuracy. [*fig. 2*]



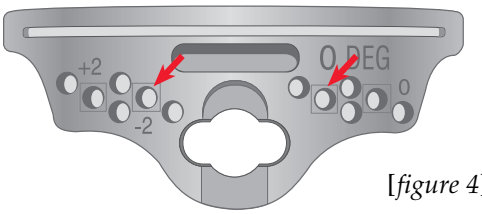
[*figure 2*]

Tibial Alignment



[*figure 3*]

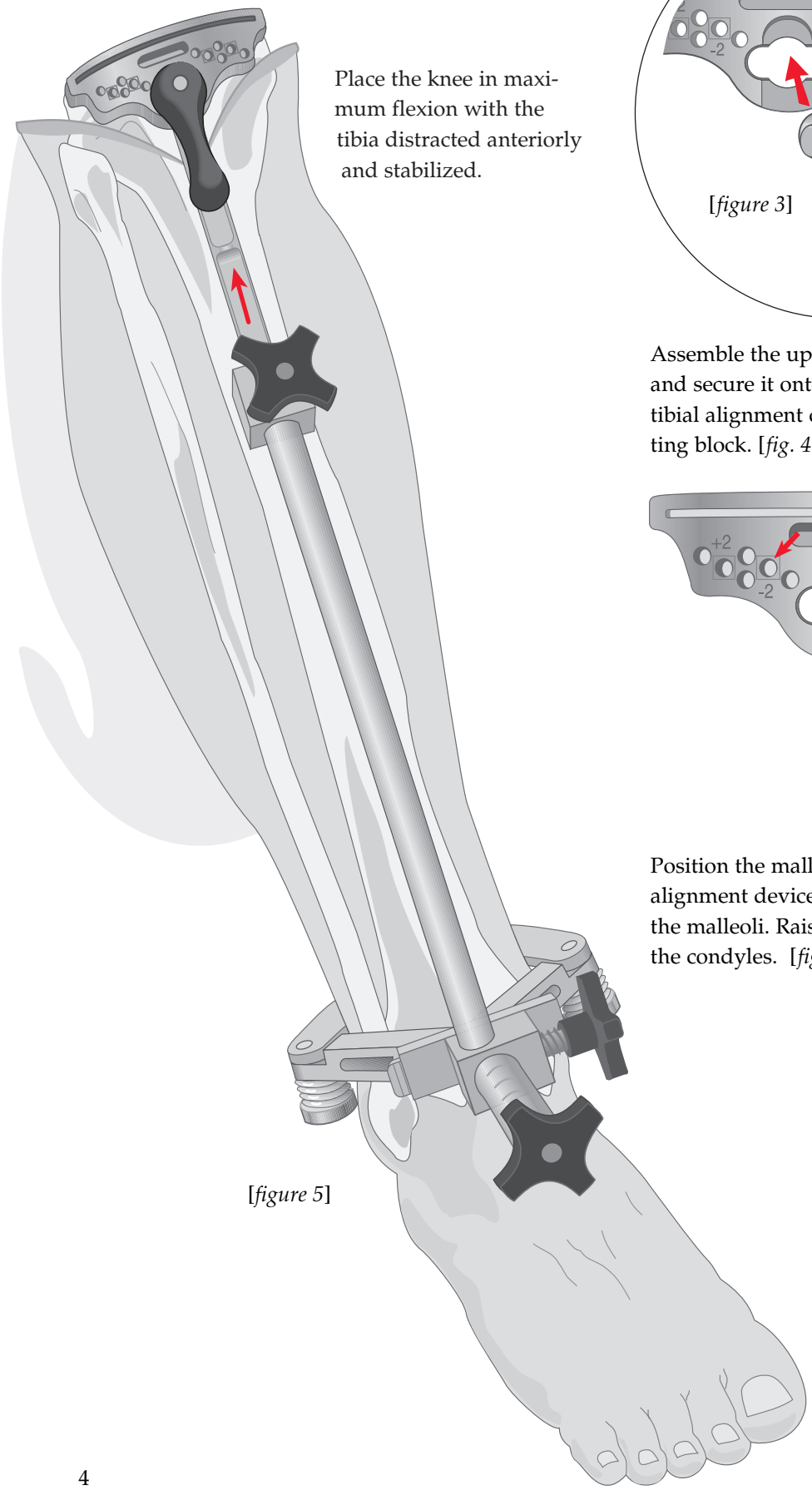
Assemble the upper cutting platform [*fig. 3]* and secure it onto the proximal uprod of the tibial alignment device. Choose a 0 degree cutting block. [*fig. 4*]



[*figure 4*]

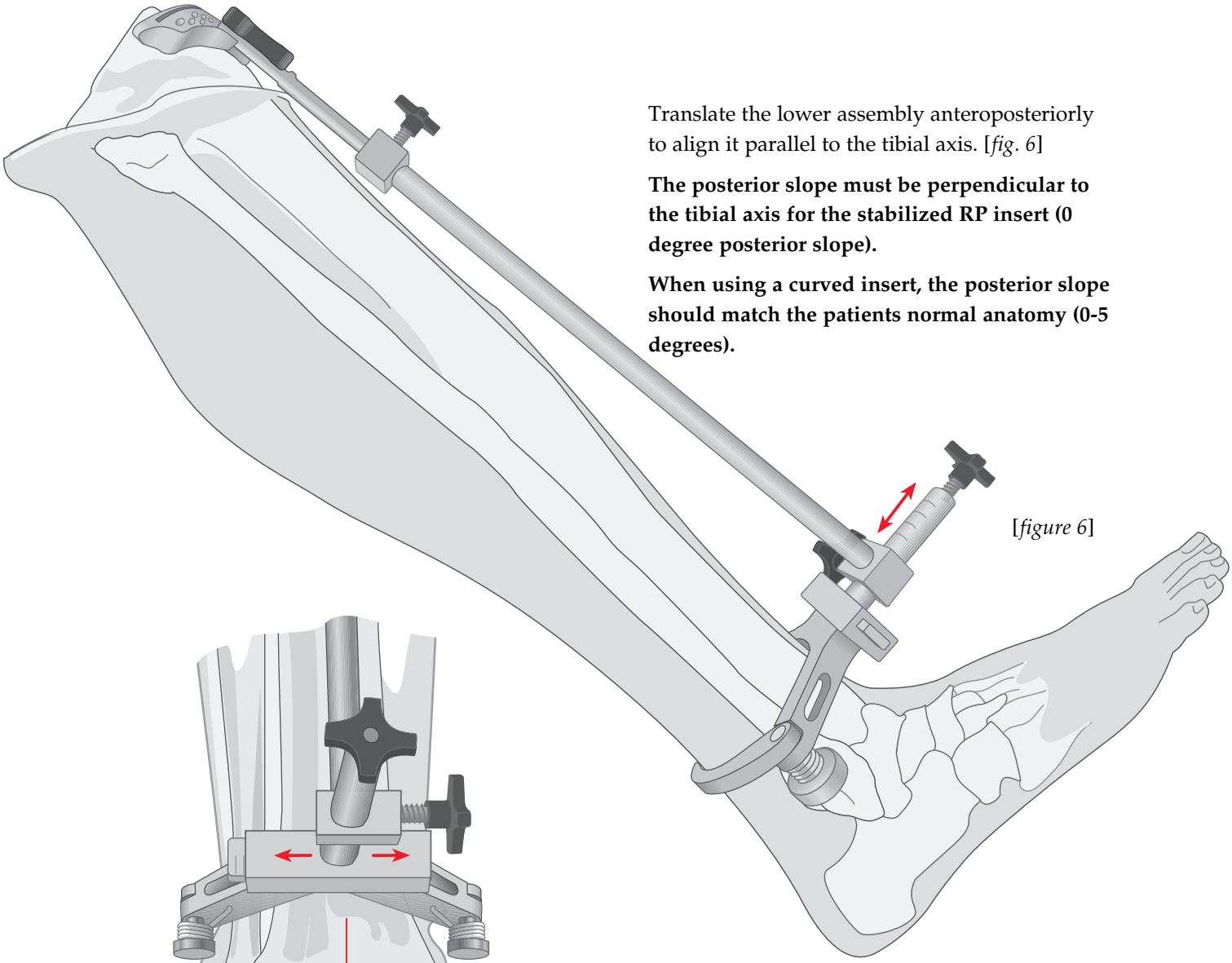
Place the knee in maximum flexion with the tibia distracted anteriorly and stabilized.

Position the malleolar clamp of the tibial alignment device immediately proximal to the malleoli. Raise the platform to the level of the condyles. [*fig. 5*]



[*figure 5*]

Tibial Alignment

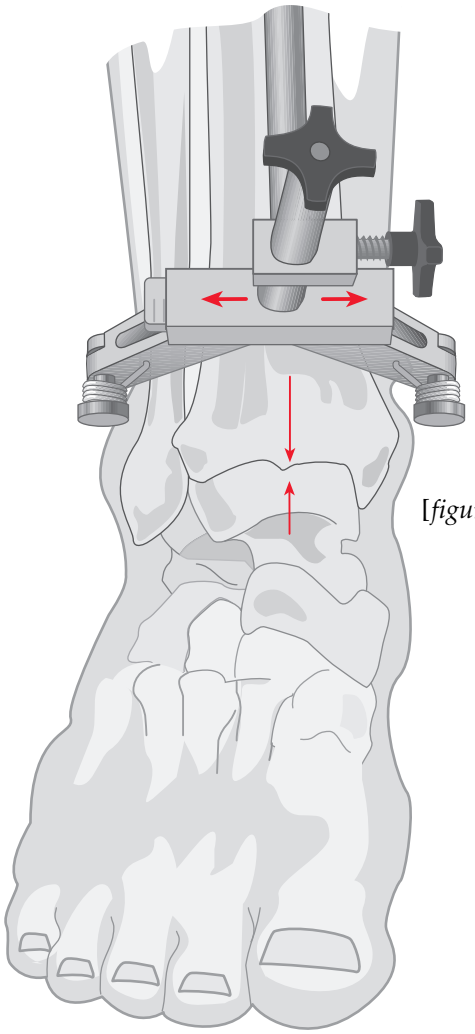


[*figure 6*]

Translate the lower assembly anteroposteriorly to align it parallel to the tibial axis. [*fig. 6*]

The posterior slope must be perpendicular to the tibial axis for the stabilized RP insert (0 degree posterior slope).

When using a curved insert, the posterior slope should match the patients normal anatomy (0-5 degrees).

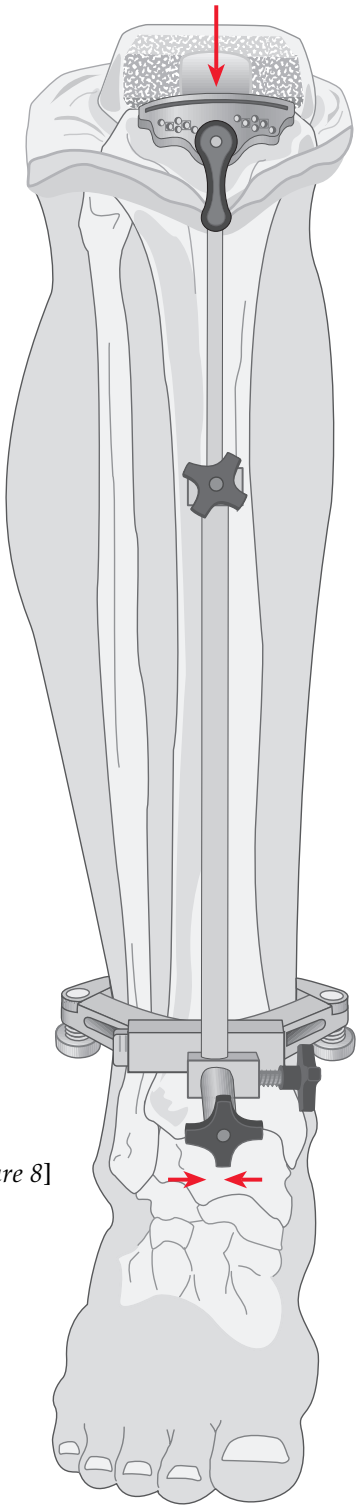


[*figure 7*]

Mediolateral alignment is approximately parallel to the tibial axis, but as the lateral malleolus is more prominent, bisecting the transmalleolar axis will prejudice the cut into varus. The midline of the tibia is approximately 3-5 mm medial to the transaxial midline. Translate the lower assembly medially to the palpable anterior crest of the tibia, usually somewhere between the first and second vertical mark. There are scribe marks at 3 and 6 mm for reference. If the platform is medially displaced, make an adjustment at the lower assembly. [*fig. 7*]

Tibial Alignment

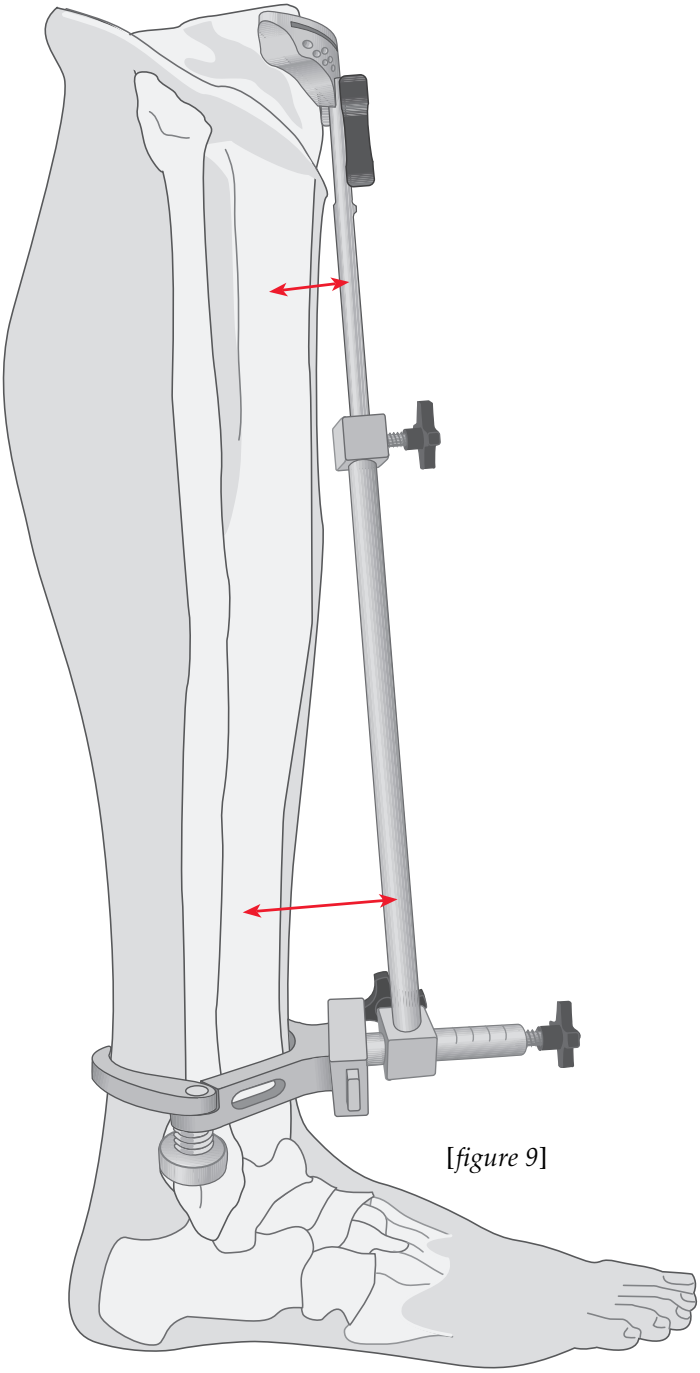
The distal portion of the long arm of the tibial alignment device should align with the center of the talus. [*fig. 8*]



[*figure 8*]

Lateral alignment is similarly confirmed. [*fig. 9*]

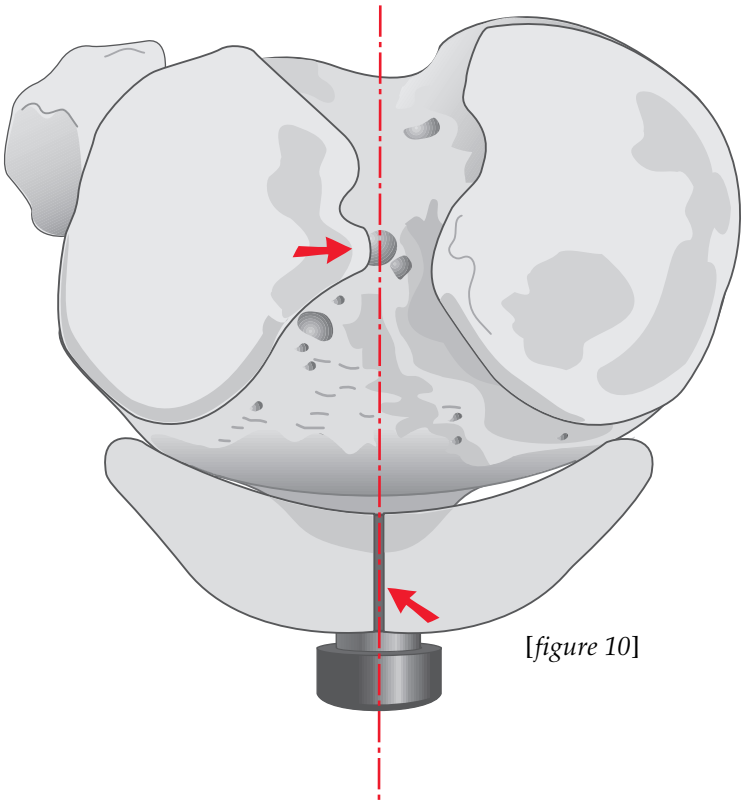
Note: Where indicated, make varus/valgus corrections by sliding the distal portion of the tibial alignment to the appropriate location.



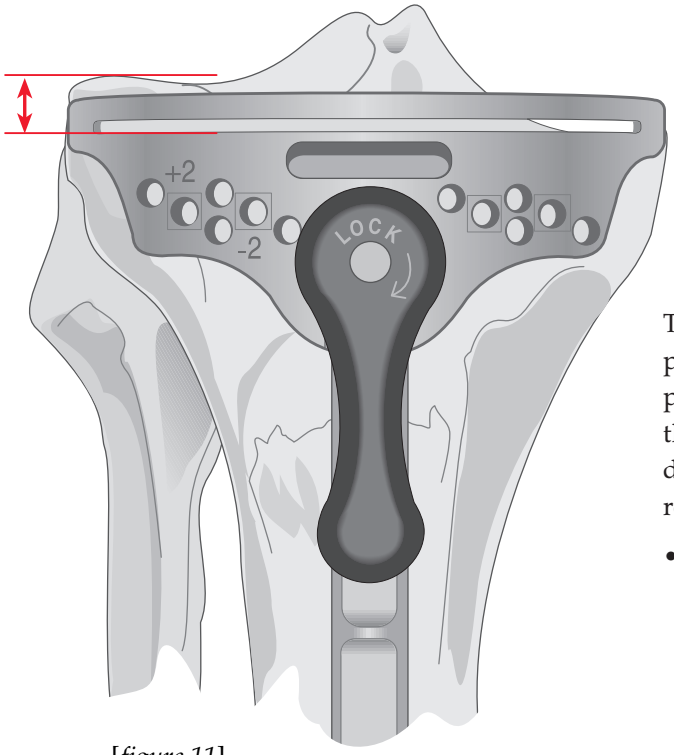
[*figure 9*]

Upper Platform

Align the upper platform with the medial third of the tibial tubercle and the medial margin of the lateral intercondylar eminence with the extremities of the cutting surface against the anterior cortex. [*fig. 10*]



[*figure 10*]



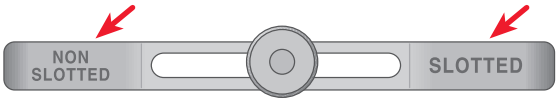
[*figure 11*]

The exact level of resection will vary according to patient anatomy. As the mediolateral transverse plane of the tibial plateau is usually 3 degrees from the perpendicular and the projected cut is perpendicular to the anatomic axis, more bone is typically removed from the lateral condyle. [*fig. 11*]

- Composite thickness of the Sigma RP tibial inserts (curved and stabilized) is 10 mm, 12.5 mm, 15 mm, and 17.5 mm.

TIBIAL STYLUS

The stylus determines the exact level of resection.

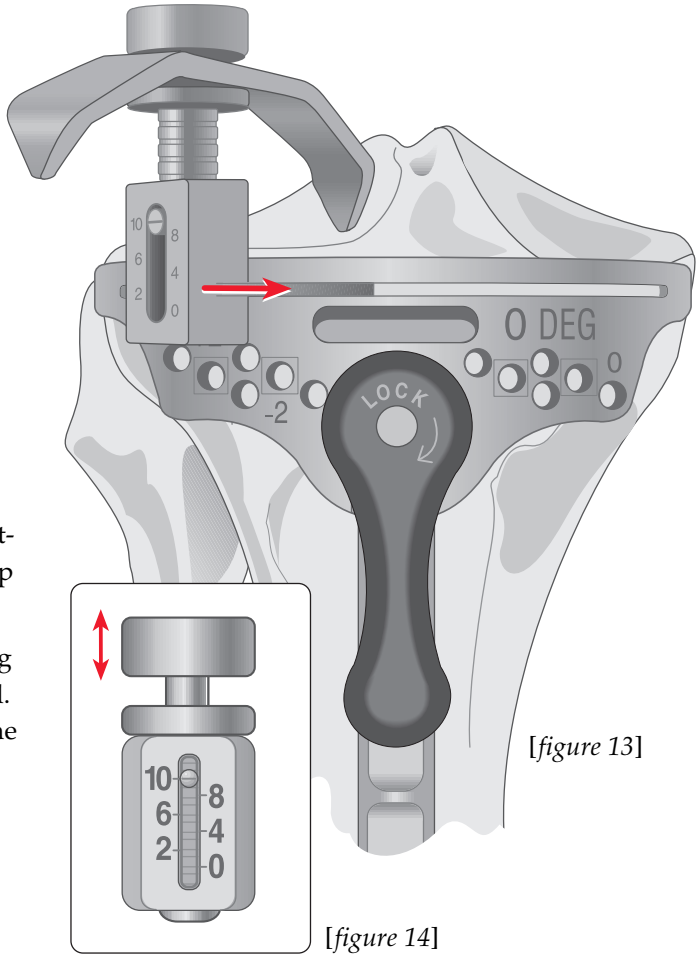


[*figure 12*]

The outrigger of the stylus is marked nonslotted and slotted at either end. [*fig. 12*] When the tibial resection is performed from the surface of the block, choose the *nonslotted* end of the outrigger; conversely, when the resection is performed through the slots, choose the *slotted* end of the outrigger. There is a 4 mm difference between the top surface and the slot.

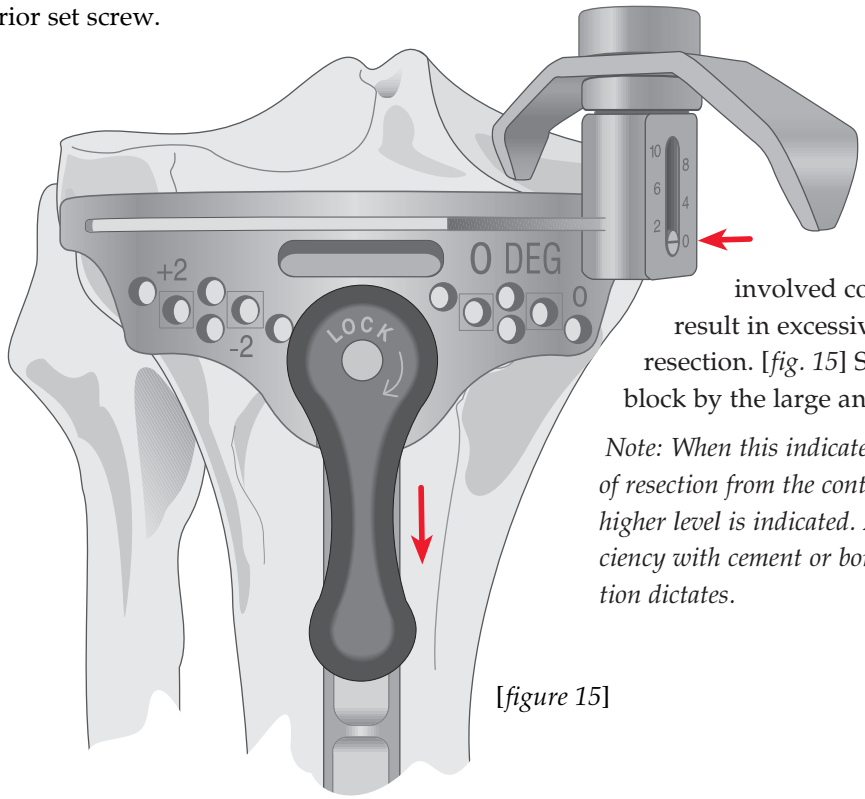
Insert the cylinder foot into the slot of the cutting block [*fig. 13*] and adjust to the appropriate level. It is calibrated in 2 mm increments, indicating the amount of bone and residual cartilage to be resected. [*fig. 14*]

A level of 10 mm is suggested when resection is based on the less involved condyle. Adjust the block so that the stylus rests on the center of the condyle and the cutting block is secured by the large anterior set screw.



[*figure 13*]

[*figure 14*]



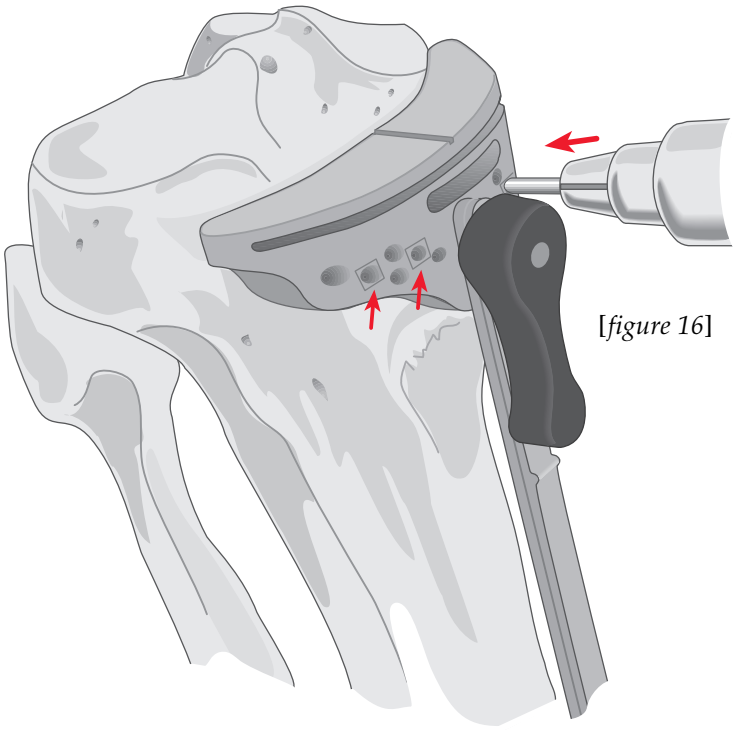
[*figure 15*]

Select level 0 when resection is based on the more involved condyle and does not result in excessive contralateral resection. [*fig. 15*] Secure the cutting block by the large anterior set screw.

Note: When this indicates greater than 10 mm of resection from the contralateral condyle, a higher level is indicated. Augment the deficiency with cement or bone graft as the situation dictates.

Securing the Platform and Tibial Resection

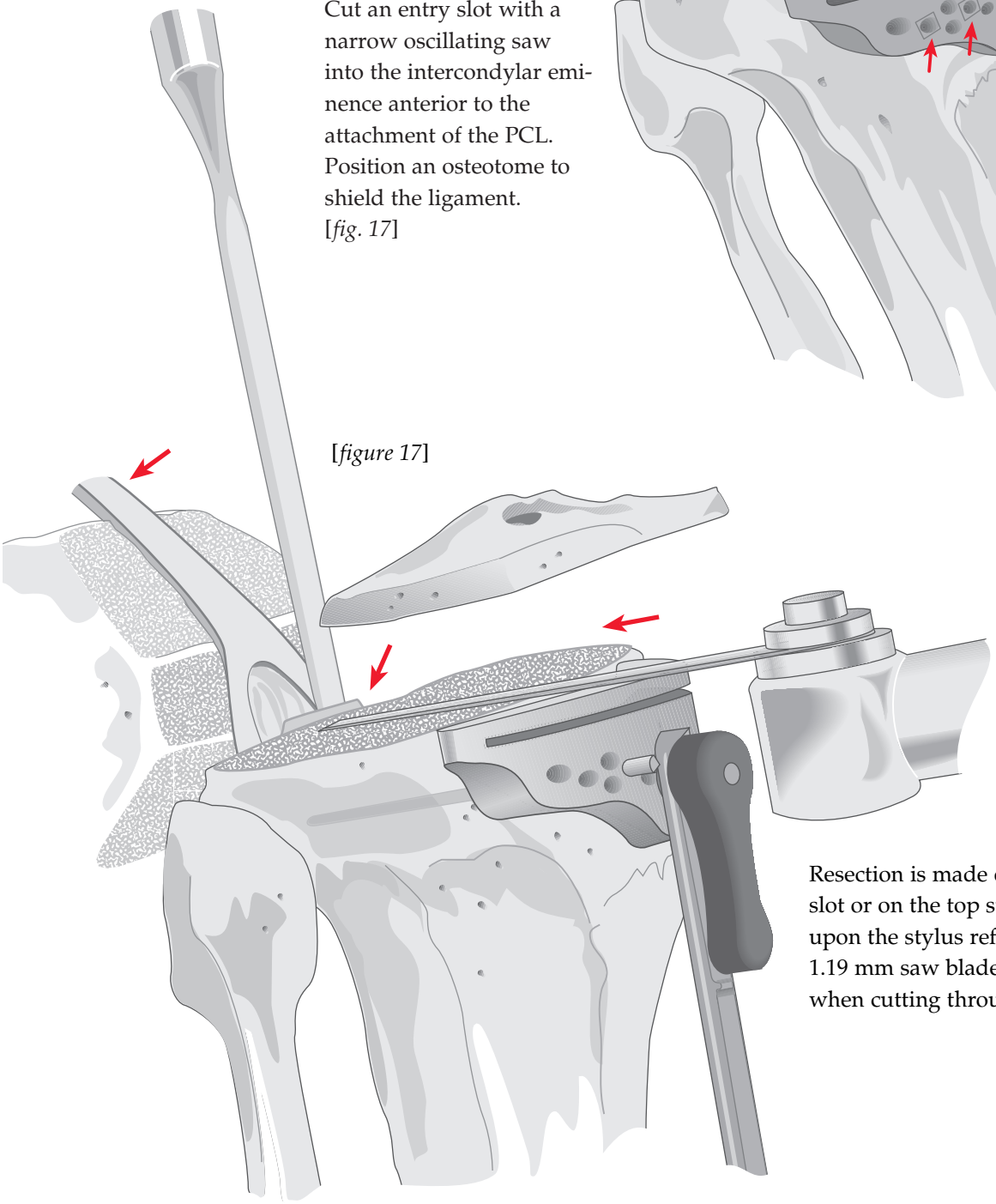
Introduce Steinmann pins or 1/8 in. drill bits through the central holes into the tibia, stopping well short of the posterior cortex. [*fig. 16*] The tibial alignment device can either be removed by unlocking the cutting block or left in place for additional stability.



[*figure 16*]

Cut an entry slot with a narrow oscillating saw into the intercondylar eminence anterior to the attachment of the PCL. Position an osteotome to shield the ligament. [*fig. 17*]

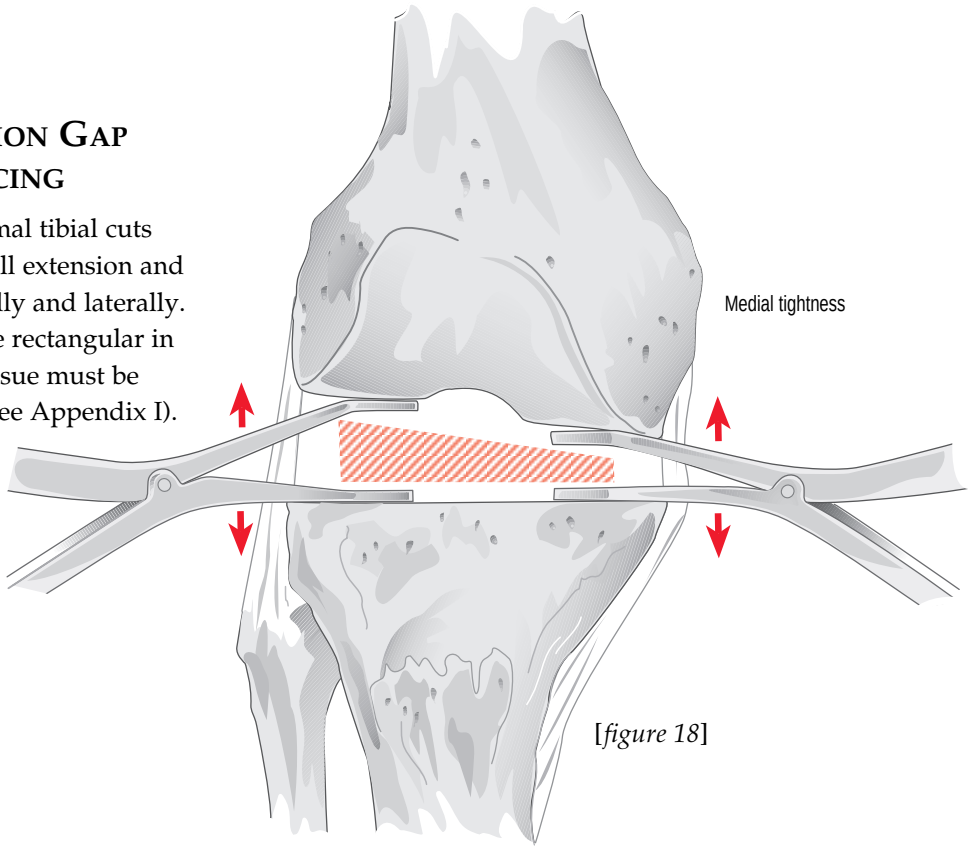
[*figure 17*]



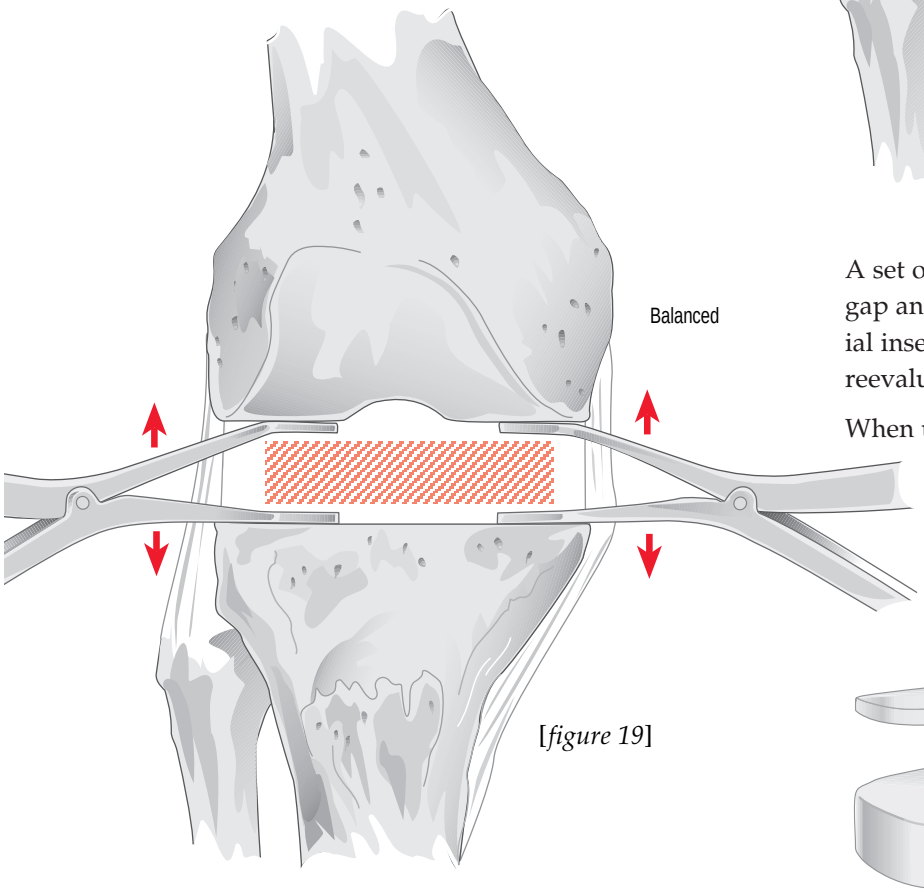
Resection is made either through the slot or on the top surface, depending upon the stylus reference used. A 1.19 mm saw blade is recommended when cutting through the slots.

EVALUATING THE EXTENSION GAP AND SOFT TISSUE BALANCING

With the distal femoral and proximal tibial cuts accomplished, place the knee in full extension and apply the lamina spreaders medially and laterally. [*fig. 18*] The extension gap must be rectangular in configuration. The bilateral soft tissue must be balanced where it is trapezoidal (see Appendix I). *Bone cuts are not altered*. [*fig. 19*]



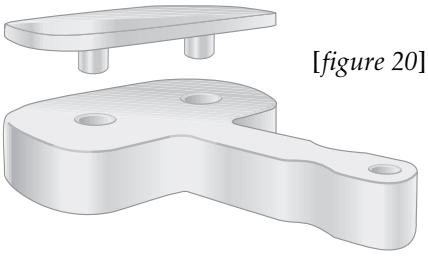
[*figure 18*]



[*figure 19*]

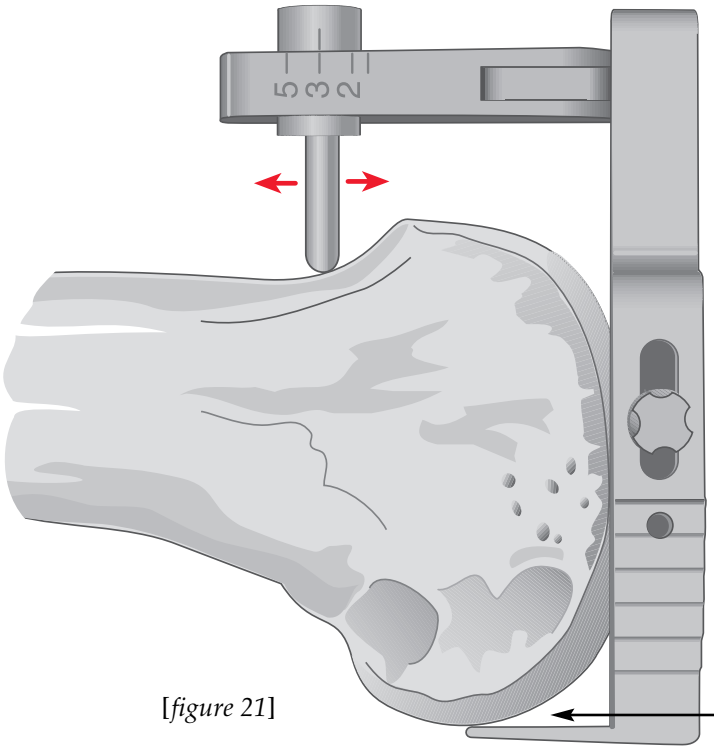
A set of spacer blocks are available to measure the gap and indicate the appropriate thickness of the tibial insert and the distal femoral implant, subject to reevaluation at trial reduction. [*fig. 20*]

When using blocks to assess flexion and extension gaps, use a 1 mm shim for the extension gap. Remove the spacer when assessing the flexion gap. This will compensate for the 1 mm difference between the distal and posterior resection levels.



[*figure 20*]

The Femoral Sizing Guide: Anterior Down / Posterior Up



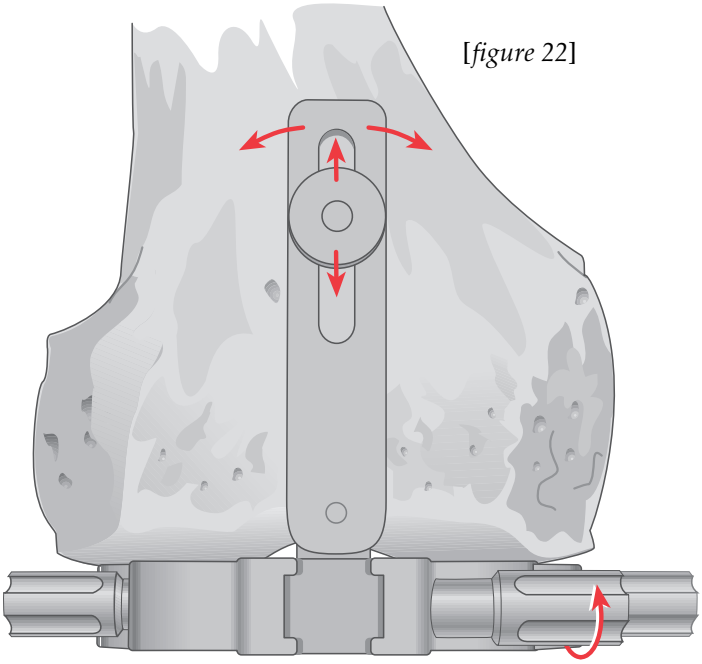
[*figure 21*]

Seat the chosen sizing guide (anterior down/ posterior up) flush and centered on the prepared distal femoral surface. Allow the stylus to move freely within the guide, and move it proximal to the articular surface. [*fig. 21*]

Care should be taken if there are deficient medial or lateral posterior condyles as this may affect femoral rotation.

Pass the stylus over the anterior cortex immediately proximal to the articular surface. At the appropriate level where the stylus is not impeded, turn the stylus locking knob clockwise until it is tight to fix its position. [*fig. 22*]

[*figure 22*]



TWO FEMORAL SIZING GUIDES ARE AVAILABLE:

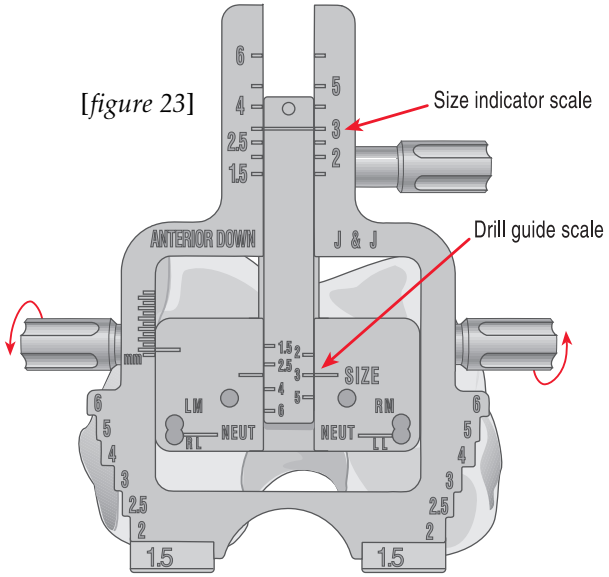
- ANTERIOR REFERENCE (ANTERIOR DOWN)
- POSTERIOR REFERENCE (POSTERIOR UP)

The two sizing guides assure a consistent posterior cut or a consistent anterior cut and the ability to accommodate femurs, which fall between whole sizes.

ANTERIOR DOWN

Use the sizing guide to position the femoral A/P chamfer cutting block so the anterior flange of the prosthesis will fit flush with the anterior cortex of the femur. When the sizing device indicates a whole size, 8 mm will be resected from the posterior condyles, corresponding to the posterior condyle thickness of the prosthesis. The serrated edges of the drill guide show the M/L dimension of the femoral component. [*fig. 23*]

[*figure 23*]



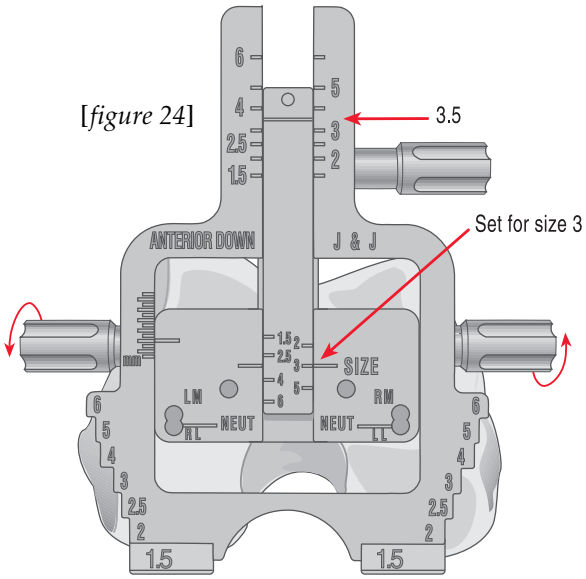
The Anterior Reference Femoral Sizing Guide

Decide whether to up or downsize based on where the femur measures between sizes (e.g. 3.5).

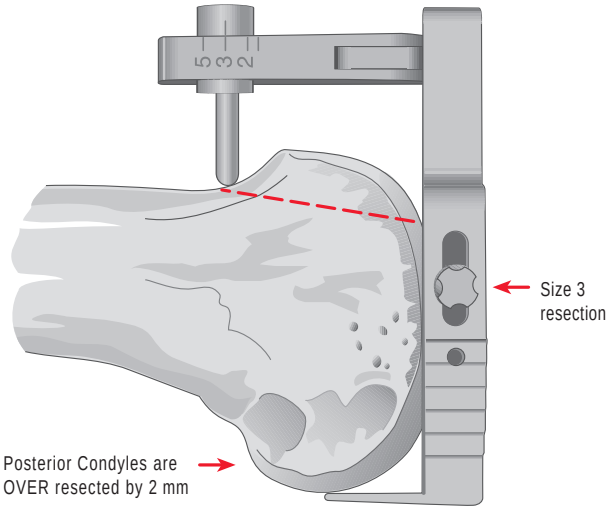
OPTION 1 – DOWNSIZE

If choosing to **downsize** when the upper scale reads 3.5, set the sizing guide (lower scale) to size 3 and use a size 3 A/P cutting block. [*fig. 24*] Because the guide uses the anterior cortex as the reference, the anterior cut level remains constant and more bone will be resected from the posterior condyles.

[*figure 24*]



The extra posterior resection increases the size of the flexion gap. If, at trial reduction, there is marked laxity in flexion, remove more distal femur and use a thicker tibial insert. [*fig. 25*]

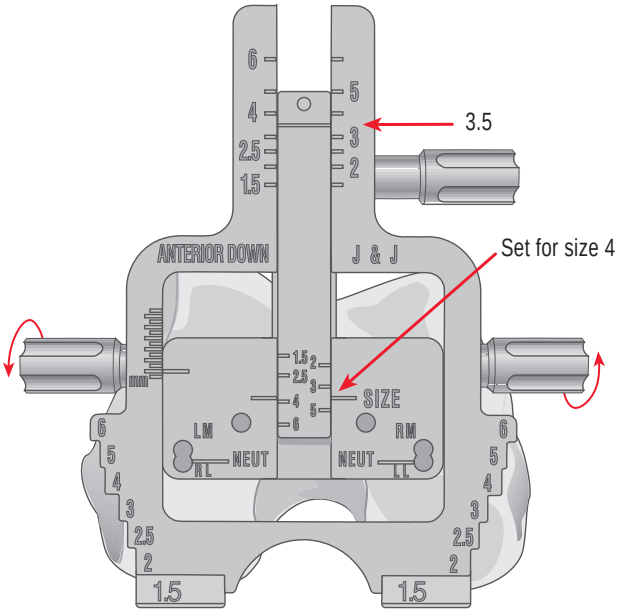


[*figure 25*]

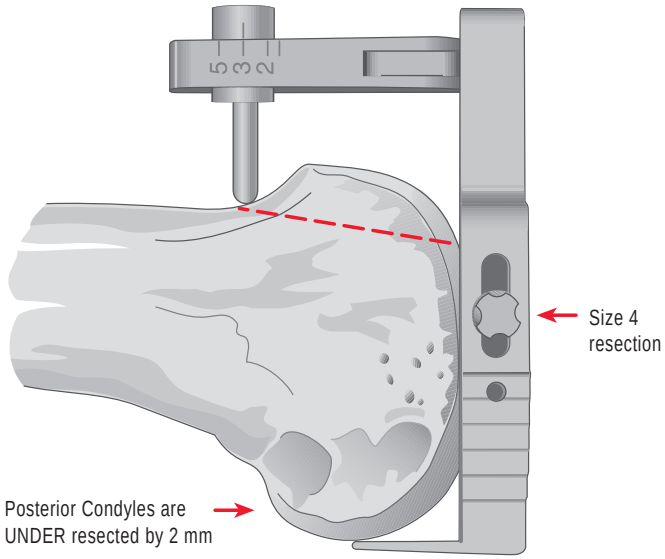
OPTION 2 – UPSIZE

When electing to **upsize** the femur, set the sizing guide (lower scale) to size 4 and use a size 4 A/P cutting block. [*fig. 26*] The anterior cut remains constant and less bone is removed from the posterior condyles.

The under resection of the posterior condyles will decrease the size of the flexion gap. [*fig. 27*] Decreasing the tibial insert thickness may cause instability in extension. To maintain balance, it is generally better to downsize and accept an over resection posteriorly.



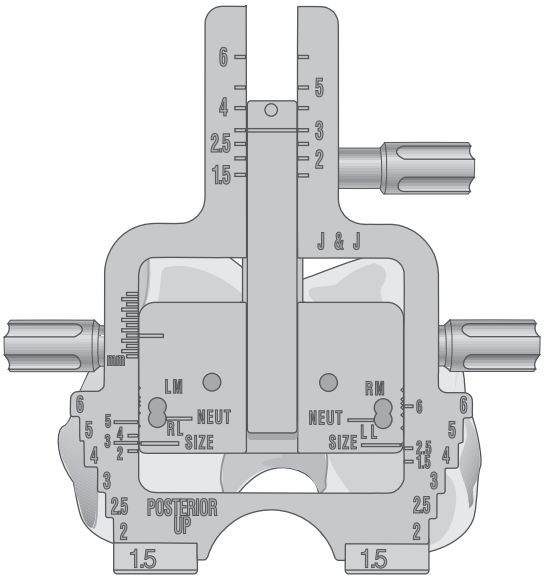
[*figure 26*]



[*figure 27*]

POSTERIOR UP

The posterior up sizing guide measures the femur in the same way as the anterior down guide. [*fig. 28*] The sizing guide will position the femoral A/P chamfer cutting block so 8 mm will be resected from the posterior condyles, corresponding to the posterior condyle thickness of prosthesis.



[*figure 28*]

The Posterior Reference Femoral Sizing Guide

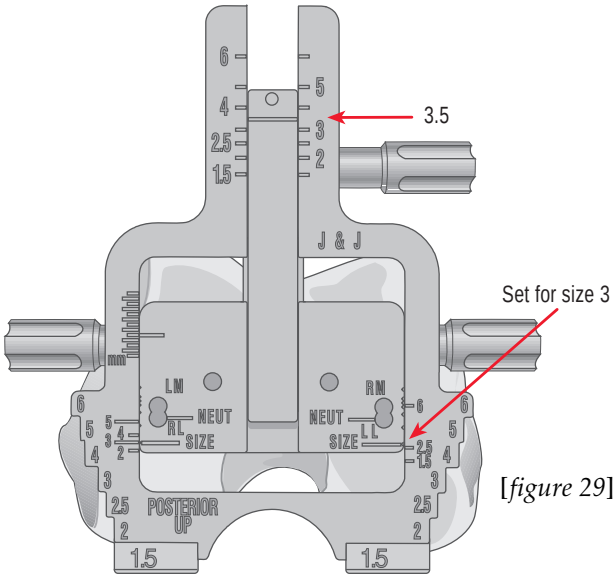
When the femur measures between sizes (e.g. 3.5), choose one of the three technique options.

OPTION 1 – DOWNSIZE

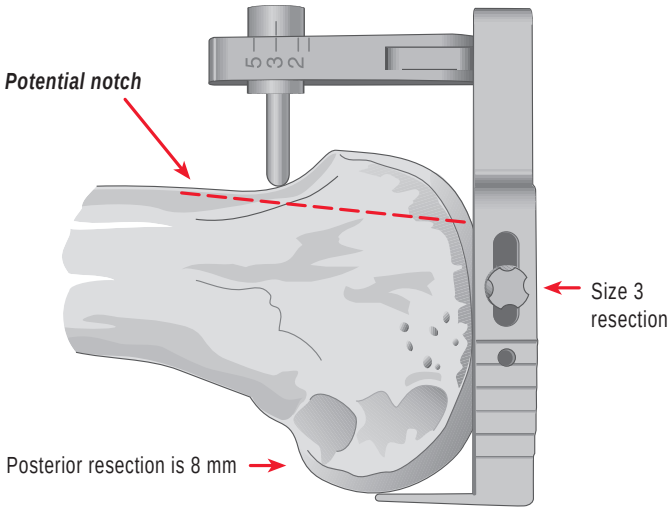
Downsize by setting the sizing guide (lower scale) to size 3 and using a size 3 cutting block. [*fig. 29*]

This will give an 8 mm posterior resection but will cause a larger anterior resection. [*fig. 30*]

Increased anterior resection may notch the anterior cortex of the femur. Femoral shaft notching should be avoided, since there is an associated risk for fracture.



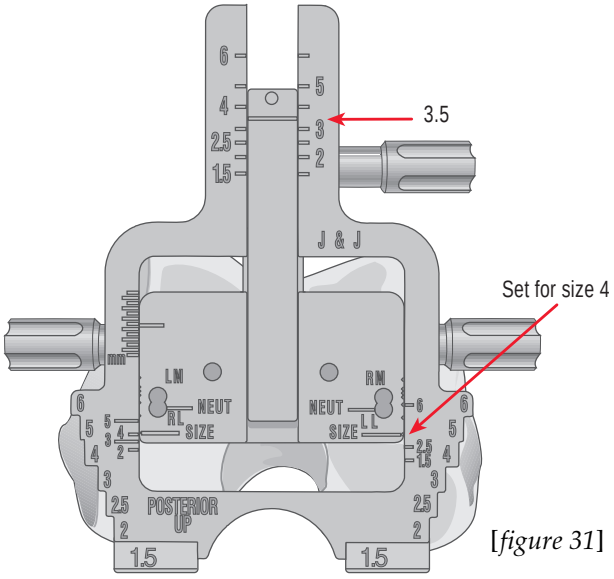
[*figure 29*]



[*figure 30*]

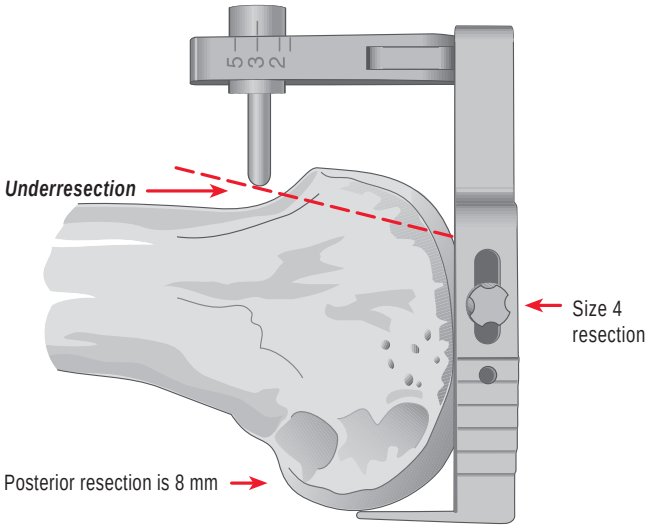
OPTION 2 – UPSIZE

Upsize by setting the sizing guide (lower scale) to size 4 and using a size 4 cutting block. [*fig. 31*] This again will resect 8 mm from the posterior condyles but less anteriorly. [*fig. 32*]



[*figure 31*]

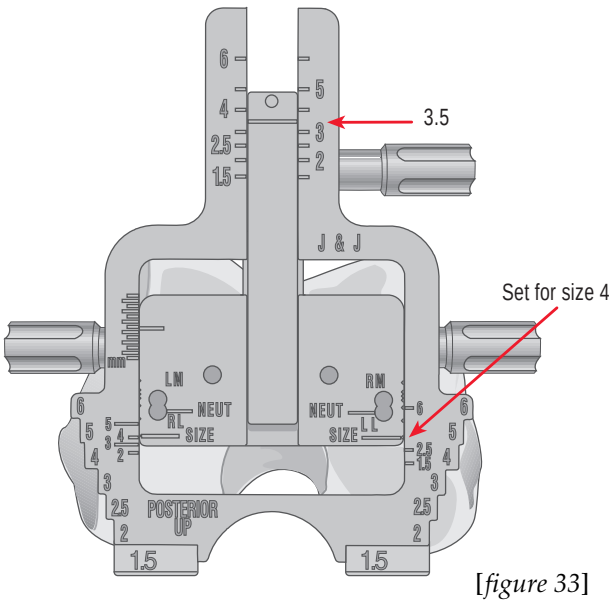
The underresection of the anterior surface can have a significant effect on the patella. It may cause tightness of the joint and high forces to be transmitted to the patella since the anterior articular surface would be too anterior.



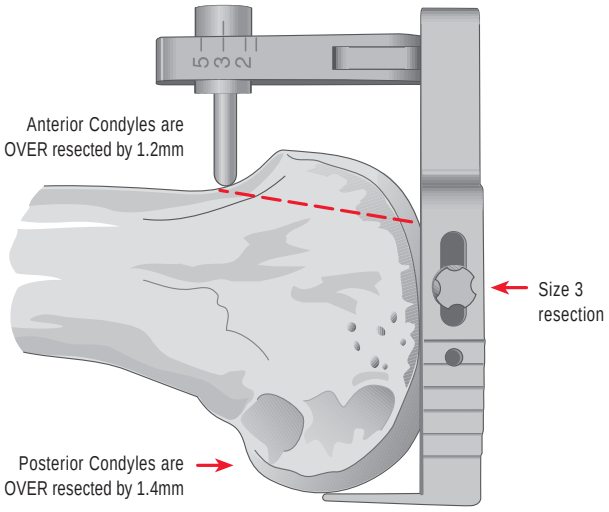
[*figure 32*]

OPTION 3 – "SPLIT THE DIFFERENCE"

Divide the extra bone resection involved in downsizing between the anterior and posterior cuts by setting the sizing guide (lower scale) to size 4 and using the size 3 cutting block. [*fig. 33*] This increases the posterior resection by 1.4 mm and the anterior by 1.2 mm. [*fig. 34*]



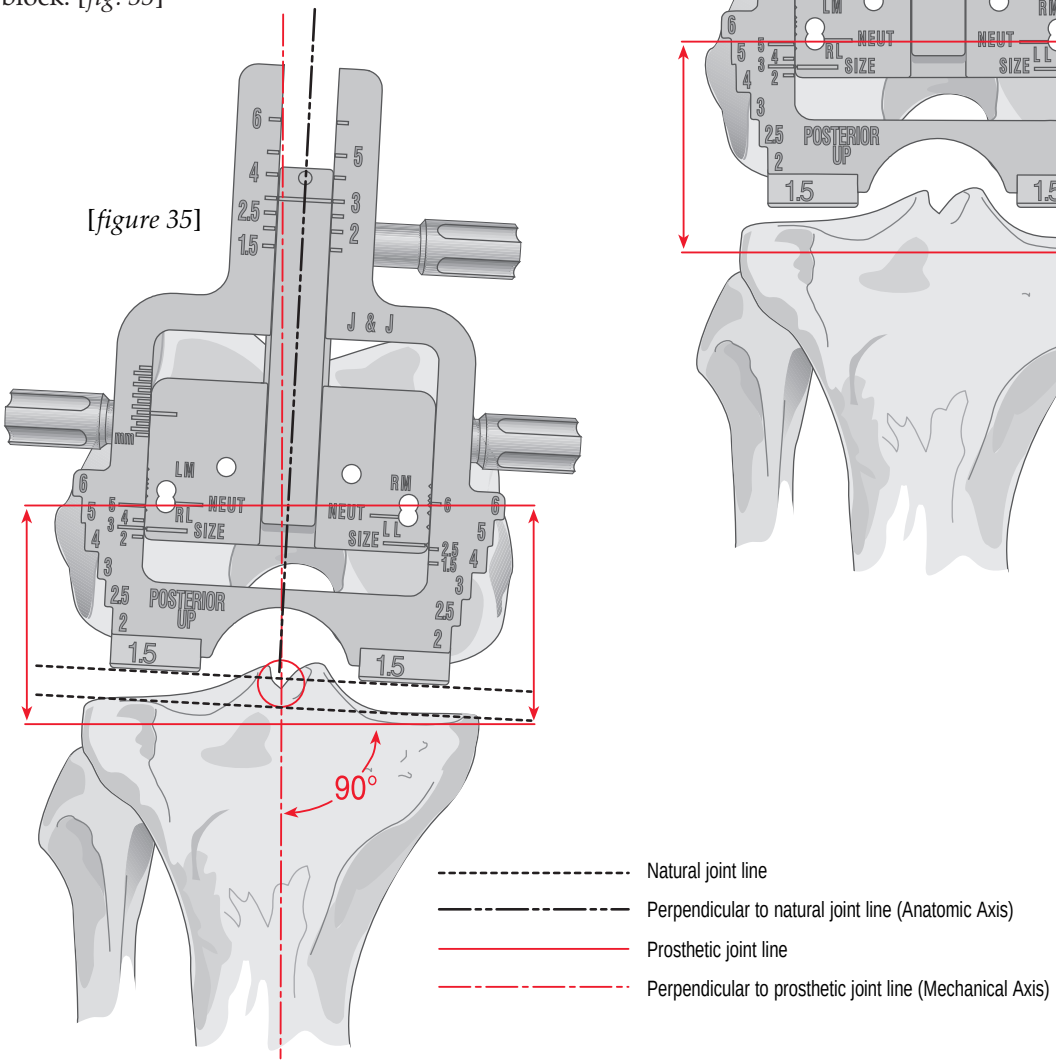
[*figure 33*]



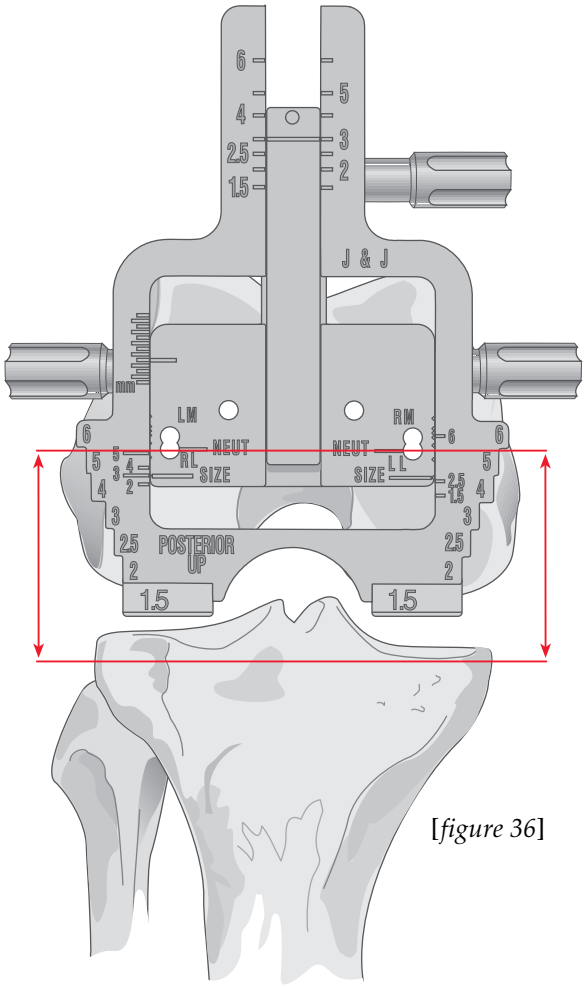
[*figure 34*]

Control internal/external rotation of the A/P cuts by resting the skids of the sizing guide on the posterior condyles. The natural joint line lies medially oblique by approximately three degrees. The tibial resection at 90 degrees to the tibial mechanical axis effectively rotates to prosthetic joint line three degrees laterally (external rotation). The anterior and posterior cuts must be externally rotated in order for the flexion gap to be a parallel/rectangular space. Follow the legend on the sizing guide, which places the medial pin in the upper hole and the lateral pin in the lower hole. Offsetting the holes produces a three degree external rotation of the cutting block. [*fig. 35*]

[*figure 35*]



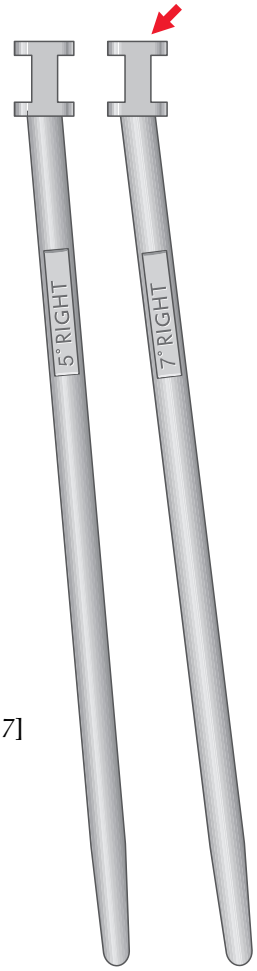
No rotation is achieved if the posterior "neutral" holes are used. [*fig. 36*]



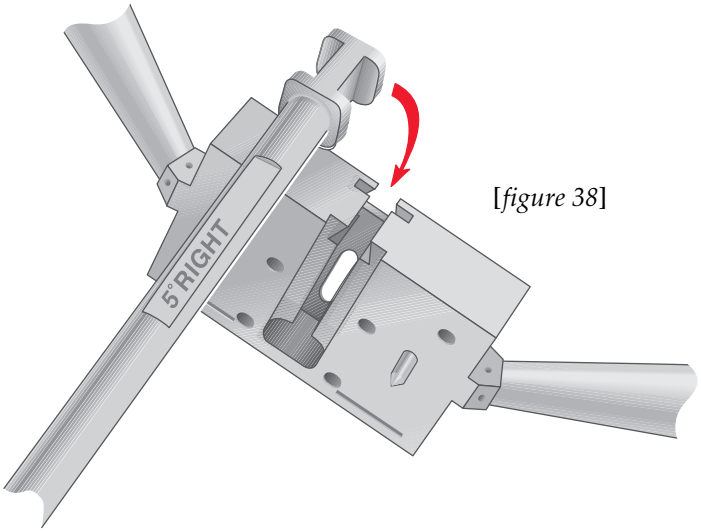
[*figure 36*]

ALTERNATIVE METHOD: THE FEMORAL A/P SIZING AND CUTTING BLOCK

Select the appropriate rod [*fig. 37*] and assemble it to the appropriately sized femoral A/P cutting block with the appropriate RIGHT/LEFT designation toward the anterior. [*fig. 38*] Retract the pins.



[*figure 37*]



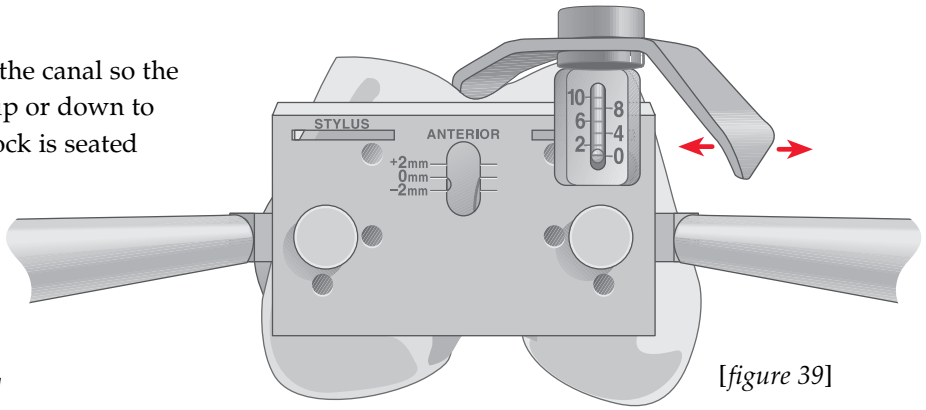
[*figure 38*]

Note: Alternatively, the femoral sizing guide can be used to position and size the component (see pages 11-16). With positioning established, use the appropriately sized A/P cutting block.

Positioning The Cutting Block

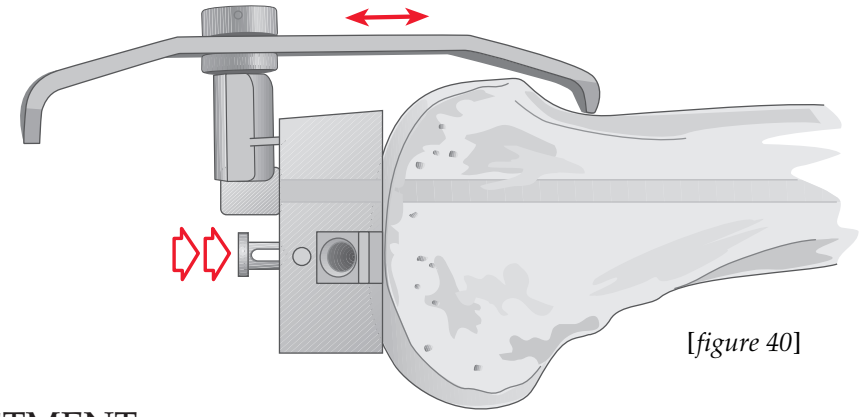
Insert the chosen I.M. rod into the canal so the A/P block is allowed to slide up or down to facilitate sizing. The cutting block is seated flush to the cut distal surface.

Fully seat the foot of the stylus assembly in its receptacle on the anterior surface of the block so that it reads 0. [*fig. 39]*



[*figure 39*]

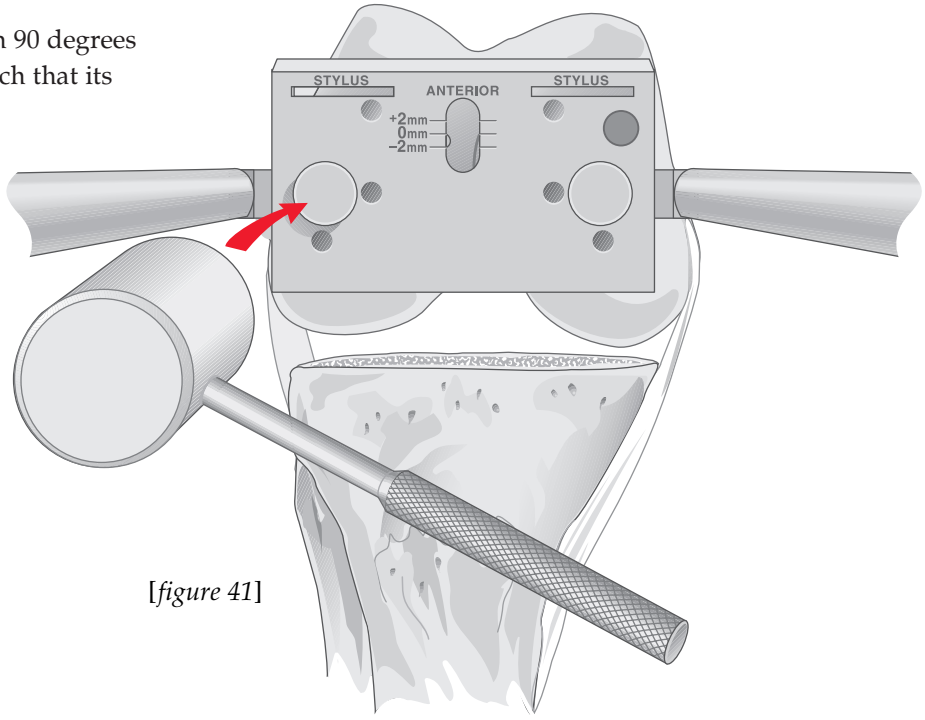
Adjust the cutting block posteriorly until the stylus, which has the arm marked **non-slotted** positioned toward the bone, is in contact with the anterior femoral cortex. [*fig. 40]*



[*figure 40*]

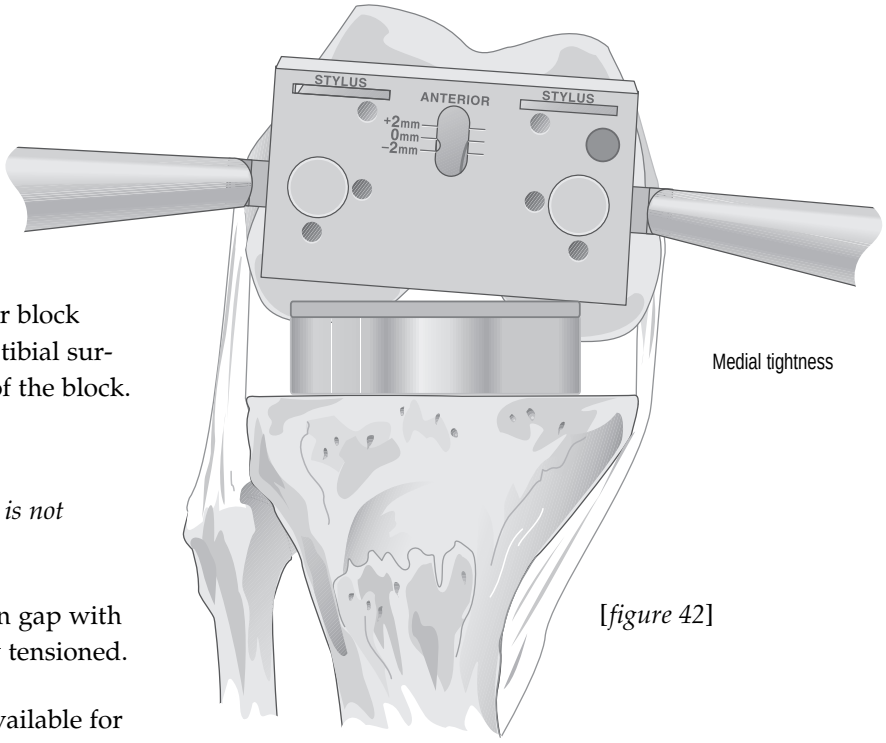
Rotational Adjustment

Determine rotation with the knee in 90 degrees of flexion and position the block such that its posterior surface is parallel to the resected tibial plateau, creating the desired rectangular flexion gap. Tap the retractable pins into the distal femur when the collateral ligaments are equally tensioned.
[*fig. 41]*



[*figure 41*]

Evaluating the Flexion Gap



[*figure 42*]

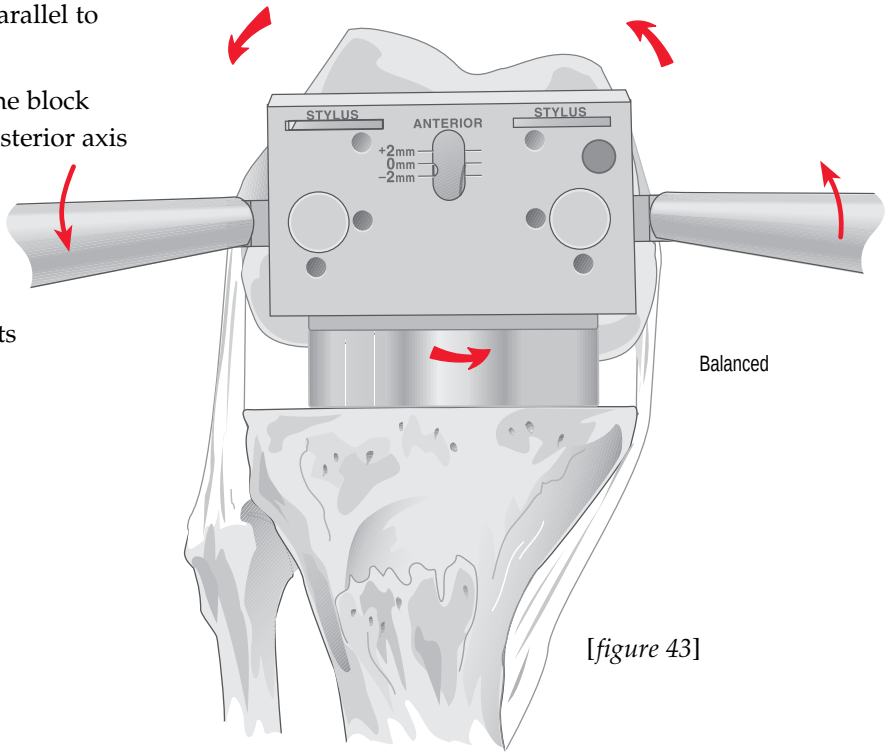
Position a properly sized spacer block between the resected proximal tibial surface and the posterior surface of the block. [*figs 42 and 43*]

Note: Further ligamentous release is not recommended at this stage.

The goal is a rectangular flexion gap with the collateral ligaments equally tensioned.

The following guidelines are available for the determination of rotation of the A/P cutting block:

1. Place the A/P cutting block parallel to the trans-epicondylar axis.
2. Place the anterior margin of the block perpendicular to the anteroposterior axis (femoral sulcus).
3. Position the block parallel to the resected proximal tibia (with the knee at 90 degrees flexion and collateral ligaments equally tensioned).



[*figure 43*]

Measuring The Flexion Gap

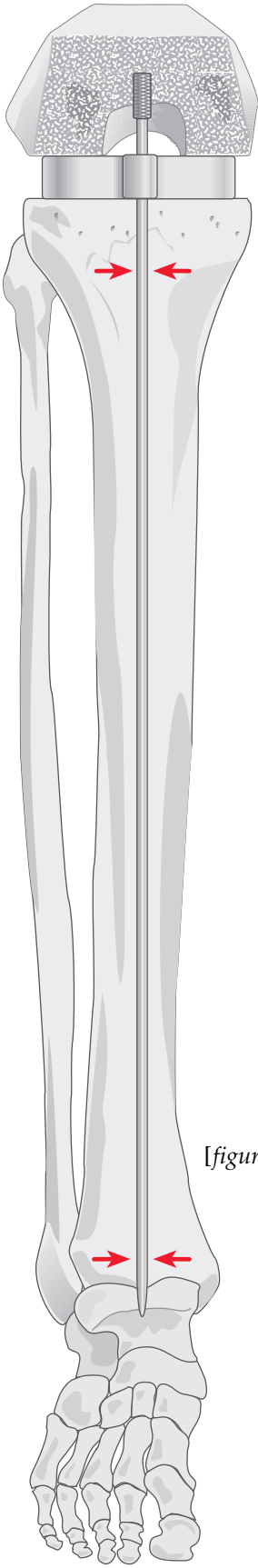
Use spacer blocks to measure the gap at 90 degrees of flexion. When using blocks to assess flexion and extension gaps, use a 1 mm shim for the extension gap. Remove it when assessing the flexion gap. This will compensate for the 1 mm difference between the distal and posterior resection levels.

Where further distal femoral resection is required to establish equivalent flexion and extension gaps, return the Steinmann pins to their original position in the anterior femoral cortex and the distal femoral cortex. Reposition the distal femoral cutting block using the holes designated +2 and +4 as indicated.

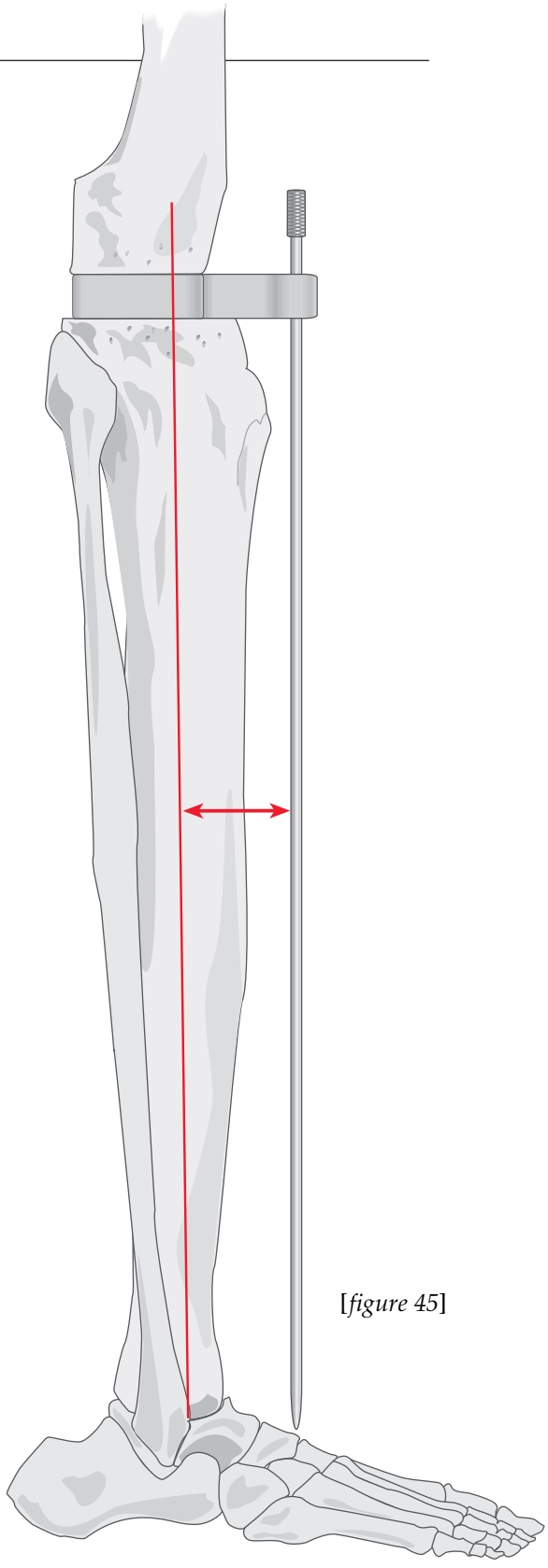
The long alignment rod should pass through the center of the talus [*fig. 44*] and lie parallel to the lateral tibial axis. [*fig. 45*]

Femoral and proximal tibial cuts are now completed. Ligament balance has been achieved.

Note: With a size 6, there is a 2 mm difference between flexion and extension on the femoral component.



[*figure 44*]



[*figure 45*]

Prior to final preparation of the proximal tibia, the surgeon may assess whether to implant a fixed or mobile-bearing prosthesis.

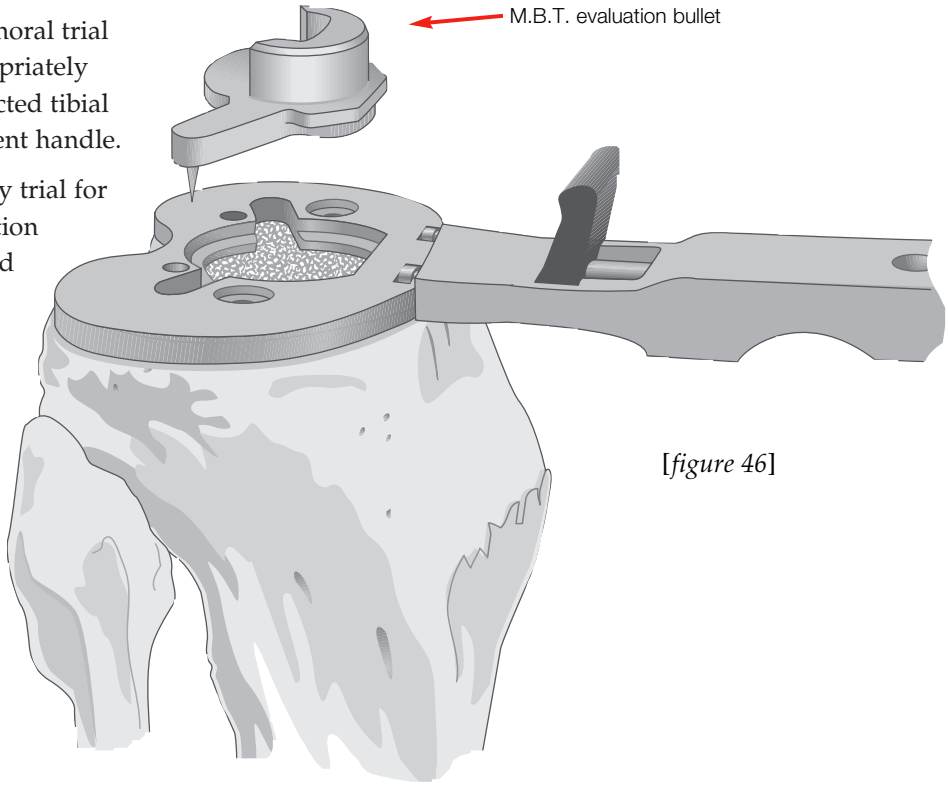
TRIAL REDUCTION WITH M.B.T. EVALUATION BULLET.

Position the appropriately sized femoral trial onto the femur and place the appropriately sized M.B.T. tray trial onto the resected tibial surface using the tibial tray alignment handle.

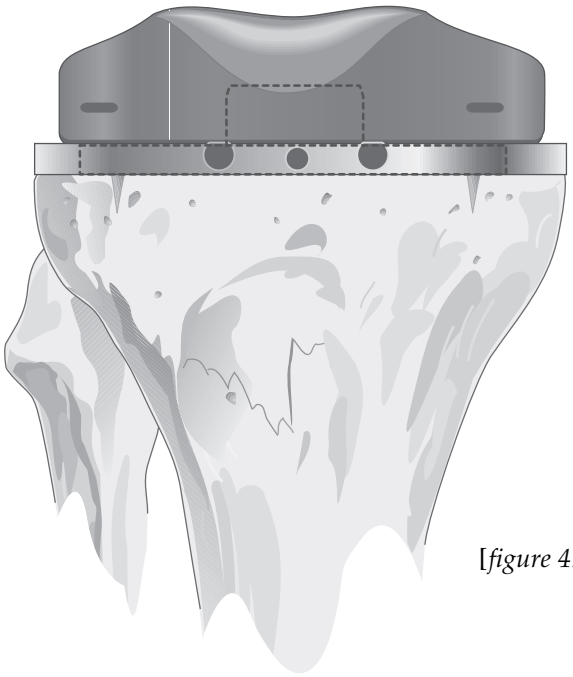
Assess the position of the M.B.T tray trial for maximum tibial coverage. The rotation of the M.B.T. tray is usually centered on the junction between the medial and central one-third of the tibial tubercle. Mark the appropriate position with electrocautery on the anterior tibial cortex.

Note: Excessive mal-rotation of the tibial tray, relative to the femoral component, can result in excessive poly overhang and impingement with soft tissues.

Position the M.B.T. evaluation bullet into the cutout of the M.B.T. tray trial and tap down lightly to secure the tray trial to the proximal tibia. [*fig. 46*]



[*figure 46*]



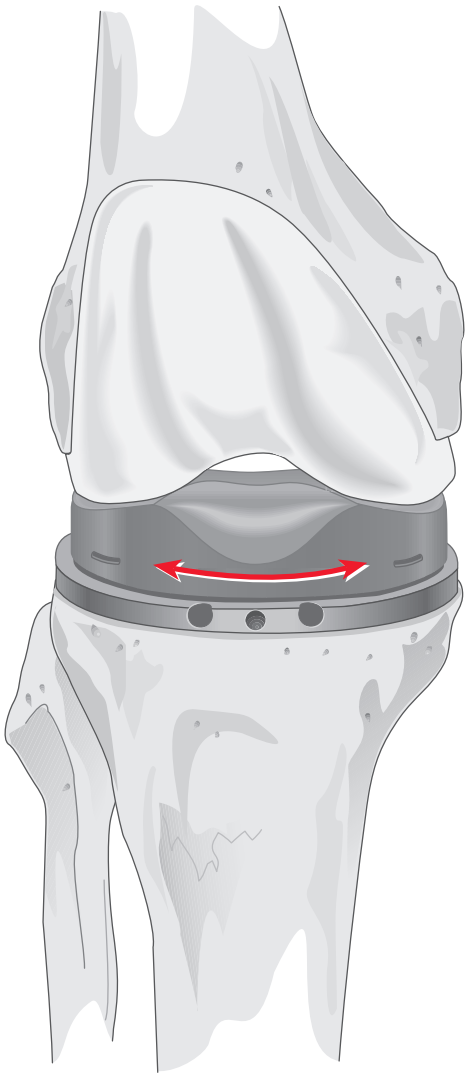
[*figure 47*]

Select the appropriate style and thickness (RP curved or RP stabilized) tibial insert trial that matches the chosen femoral size and type, and place it onto the M.B.T. tray trial. [*fig. 47*]

Remove the tibial tray alignment handle. With the trial prosthesis in place, extend and flex the knee carefully, noting the anteroposterior stability, medial/lateral stability and overall alignment in the A/P and M/L planes throughout a full range of motion. [*fig. 48*] Assess insert rotation and patellofemoral tracking. Optionally, confirm overall alignment using the two-part alignment rod, by attaching them to the tibial tray alignment handle.

If there is any indication of instability, substitute a tibial insert trial with the next greater thickness and repeat reduction. Select the insert which gives the greatest stability in flexion and extension while still allowing full extension. Confirm tray rotation and position and mark with electrocautery if this has not already been done.

At this stage it is possible to prepare the proximal tibia for a P.F.C. Sigma fixed-bearing tibial tray and insert if this is the preferred option. (Please refer to the P.F.C. Sigma Knee System primary cruciate-retaining and cruciate-substituting procedure Cat. No. SP2-007, Rev. 1).



[*figure 48*]

BUILD-A-TRIAL TIBIAL PREPARATION

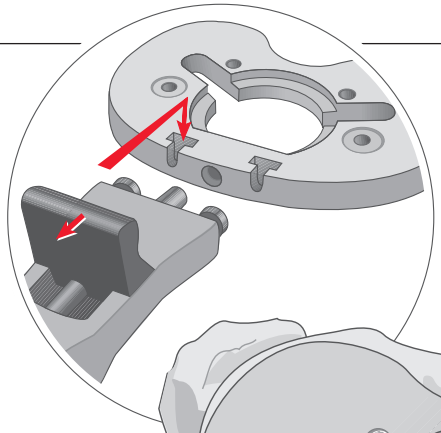
With the knee in full flexion and the tibia subluxed anteriorly, assemble the alignment handle onto the M.B.T. tray trial.

Connect the tibial tray alignment handle to the M.B.T. tray trial by retracting the lever, inserting the two pins into the anterior portion of the tray trial and releasing the lever. [*fig. 49*] Place the tray trial onto the resected tibial surface. Take care to maximize the coverage of the M.B.T. tray trial on the proximal tibia. [*fig. 50*]

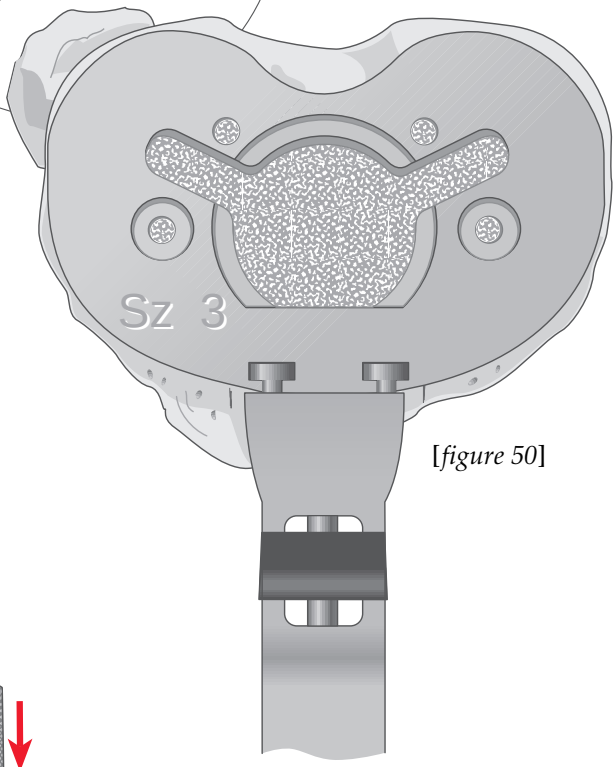
Note: Excessive mal-rotation of the tibial tray, relative to the femoral component, can result in excessive poly overhang and impingement with soft tissue.

Secure the tray with two fixation pins inserted through the recessed holes. Mark rotational alignment of the M.B.T. tray trial with electrocautery on the anterior tibial cortex to aid in the permanent tibial tray implantation. [*fig. 51*]

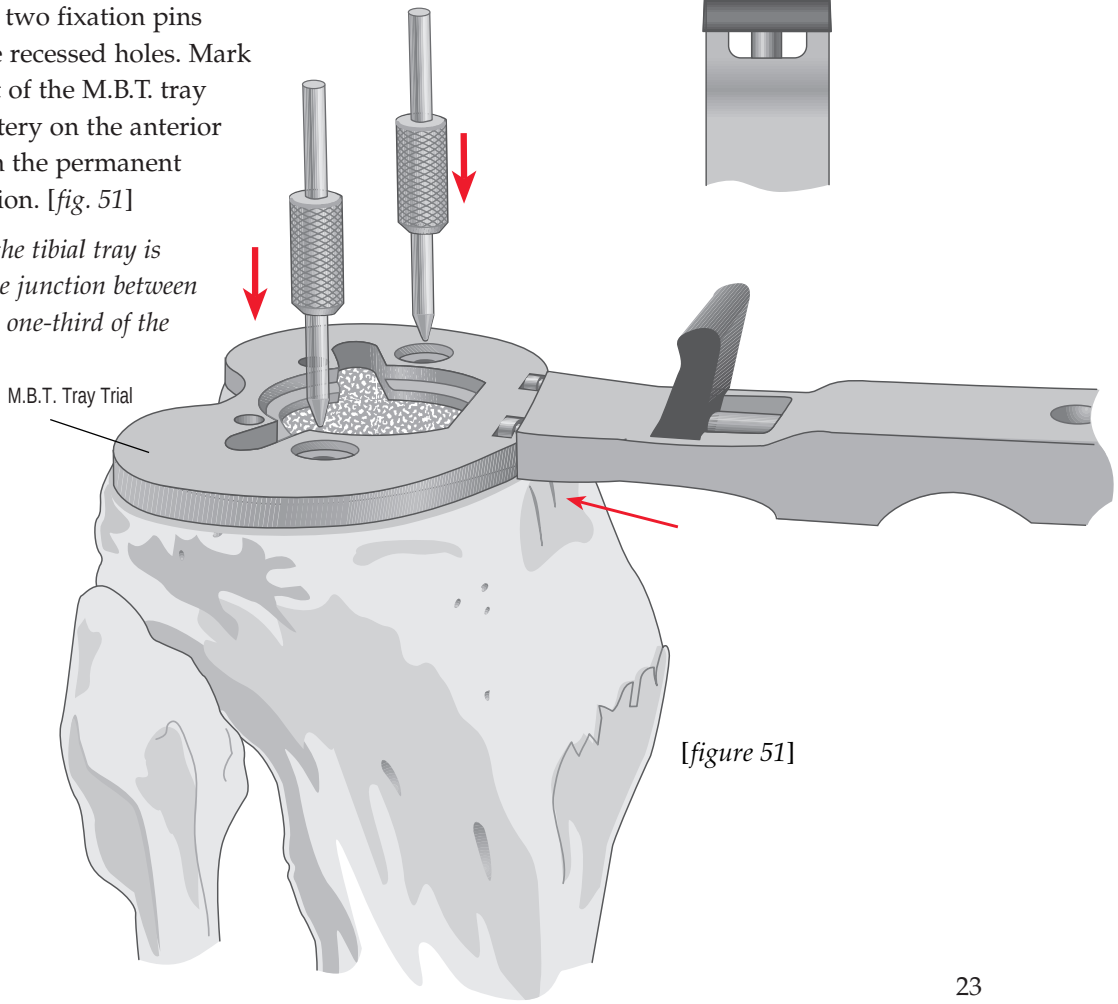
Note: The rotation of the tibial tray is usually centered on the junction between the medial and central one-third of the tibial tubercle.



[*figure 49*]



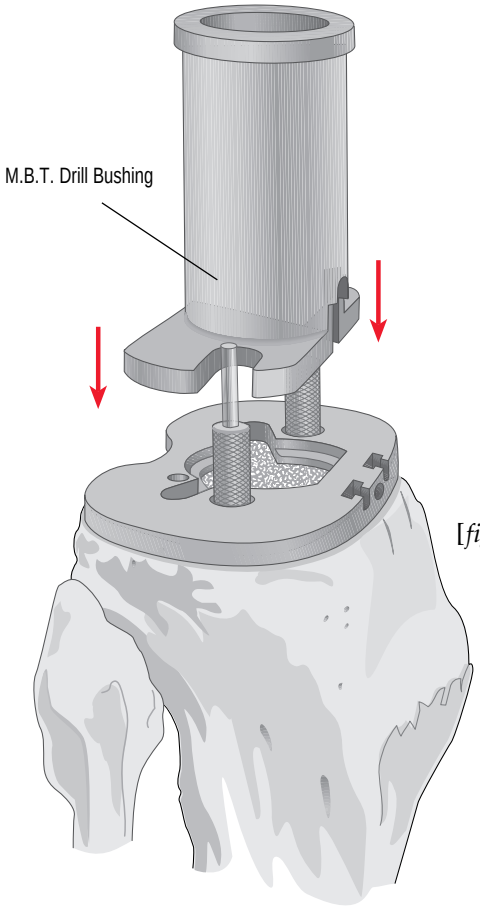
[*figure 50*]



[*figure 51*]

Seat the M.B.T. drill bushing into the tibial tray trial by lightly tapping the top of the drill bushing. [*fig. 52*]

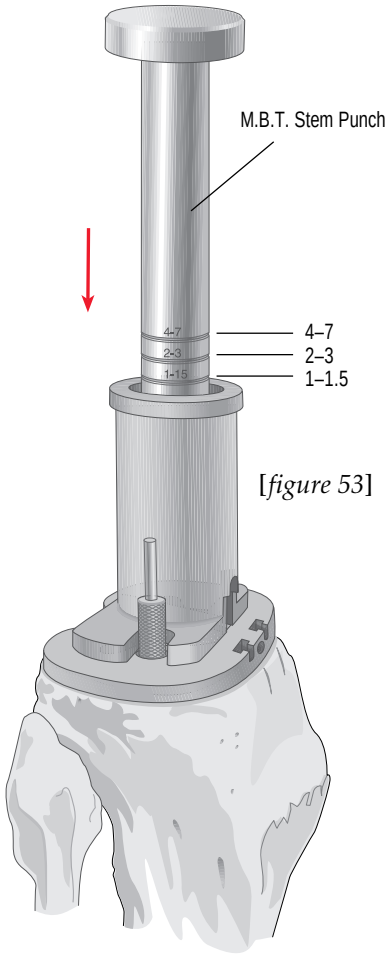
In cases where the proximal tibial bone is sclerotic, use a Steinmann pin to drill two small holes posteriorly to facilitate the placement of the spikes on the drill bushing onto the tray trial.



[*figure 52*]

FOR NON-CEMENTED APPLICATION:

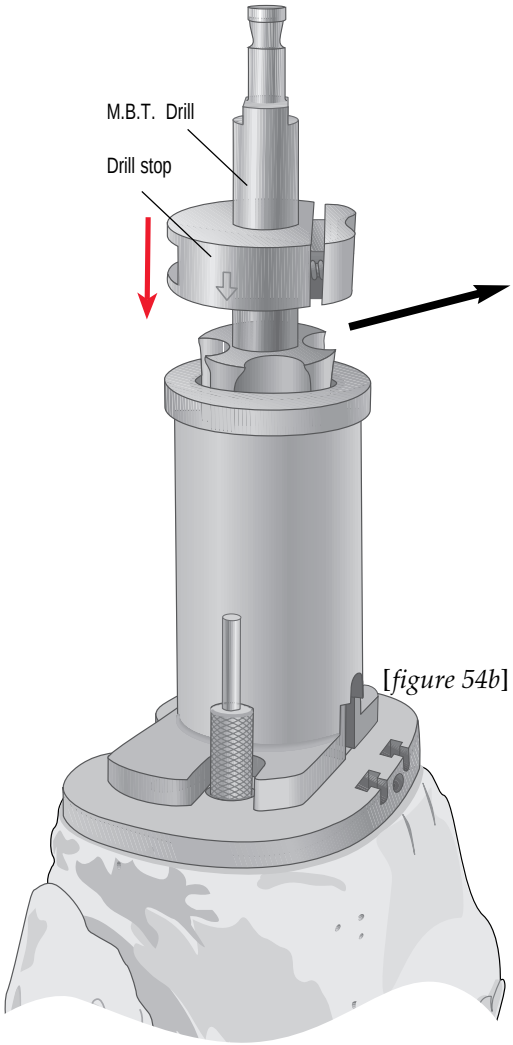
Advance the M.B.T. stem punch into the drill bushing and impact into the cancellous bone until the appropriate tray size marking is reached. [*fig. 53*]



[*figure 53*]

FOR CEMENTED APPLICATION:

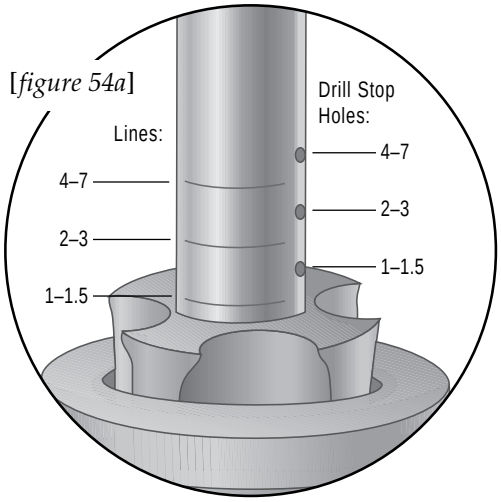
Assemble the drill stop onto the M.B.T. drill and position at the selected tray size. [*fig. 54a*] Advance the M.B.T. drill through the M.B.T. drill bushing and into the cancellous bone, until it hits the drill stop. [*fig. 54b*]



[*figure 54b*]

Note: The M.B.T. drill creates a cavity that is line-to-line with the punch bushing and final implant. Cement will interdigitate as the tray is implanted. If a larger cement mantle is desired, see table A. The porous tray will create a "true" interference fit of 1.6 mm around the entire central stem when fully impacted.

[*figure 54a*]



Note: If over-reaming is desired, remove the tray trial to avoid impingement of the reamer on the tray trial.

To compact cancellous bone, advance the drill in reverse.

TABLE A

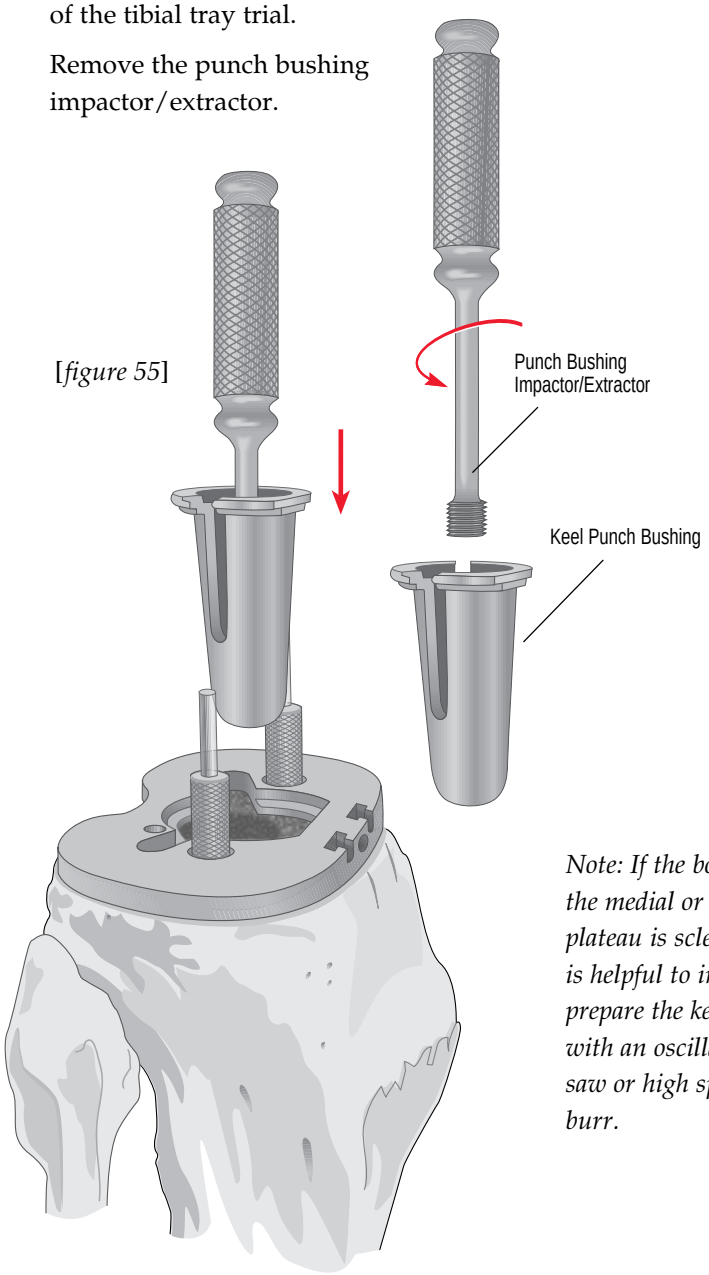
CREATING CENTRAL STEM MANTLE		
Tray Size	**Drill Stop Setting**	**Cement Mantle**
1-1.5	2-3	.5 mm per side/4 mm distal
2-3	4-7	.5 mm per side/4 mm distal
4-7	drill "bottoms out" on tray trial	.5 mm per side/4 mm distal

M.B.T. Tray *with* *Keel* Preparation

Insert the M.B.T. keel punch bushing into the M.B.T. tray trial, utilizing the M.B.T. punch bushing impactor/extractor. [*fig. 55*] When complete, the superior surface of the punch bushing should be flush with the superior surface of the tibial tray trial.

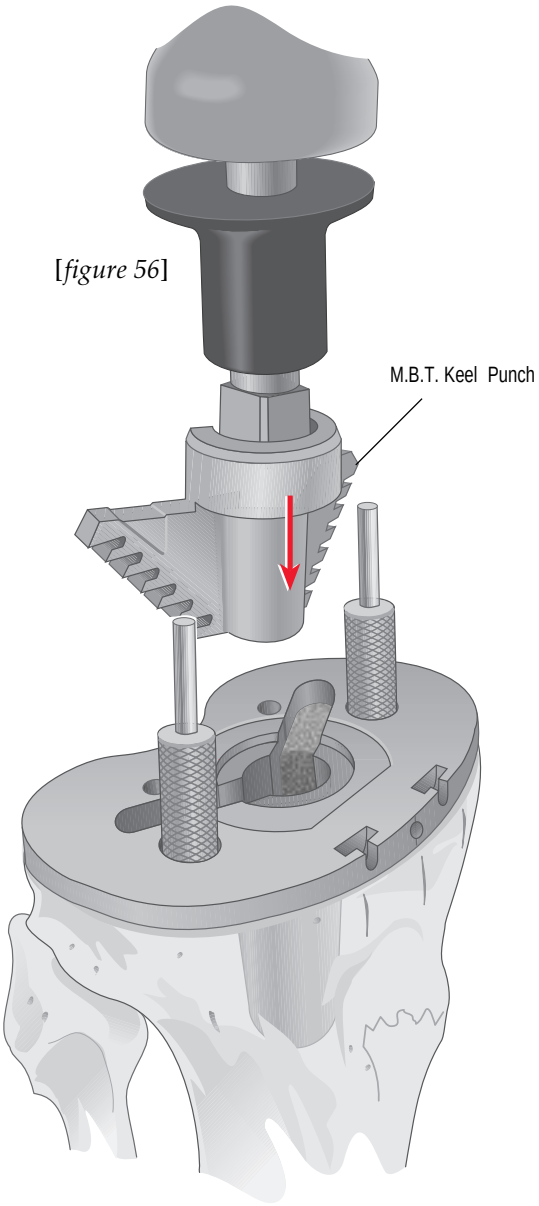
Remove the punch bushing impactor/extractor.

[*figure 55*]



Assemble the universal handle to the appropriately sized M.B.T keel punch and insert it into the M.B.T punch bushing, being careful to avoid malrotation. Impact this composite into the cancellous bone until the shoulder of the punch is in even contact with the M.B.T. punch bushing. [*fig. 56*] Disconnect the universal handle, leaving the M.B.T punch in place.

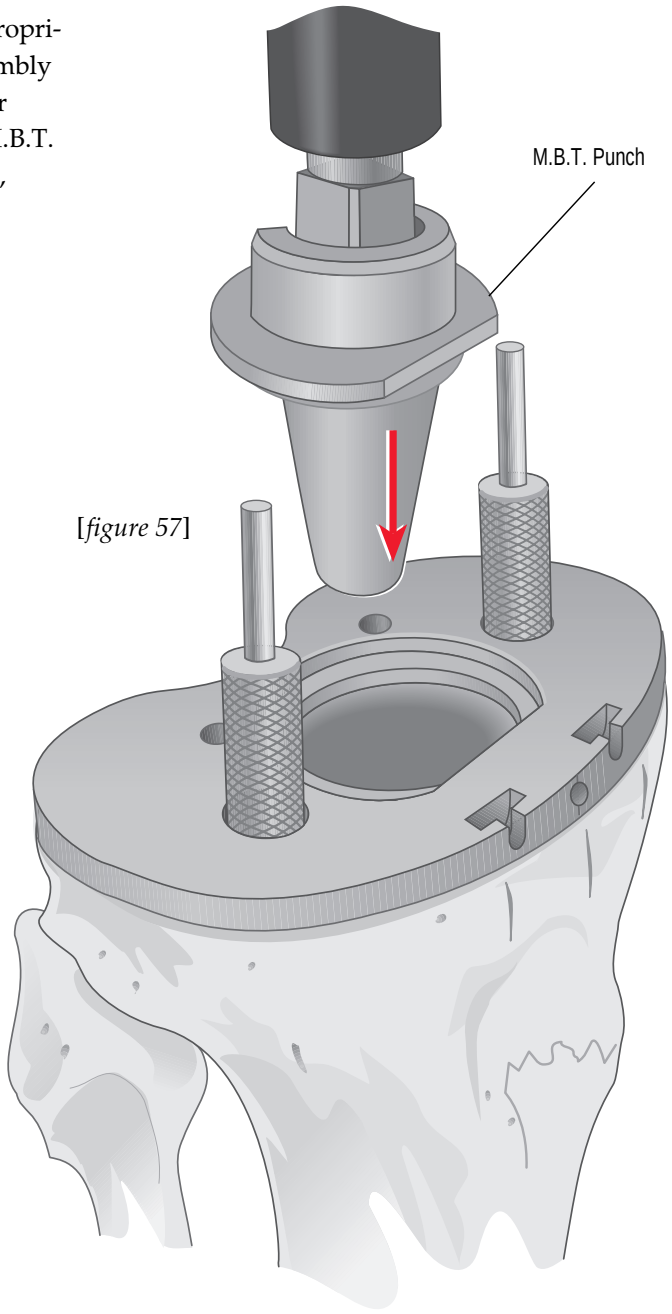
[*figure 56*]



Note: If the bone of the medial or lateral plateau is sclerotic, it is helpful to initially prepare the keel slot with an oscillating saw or high speed burr.

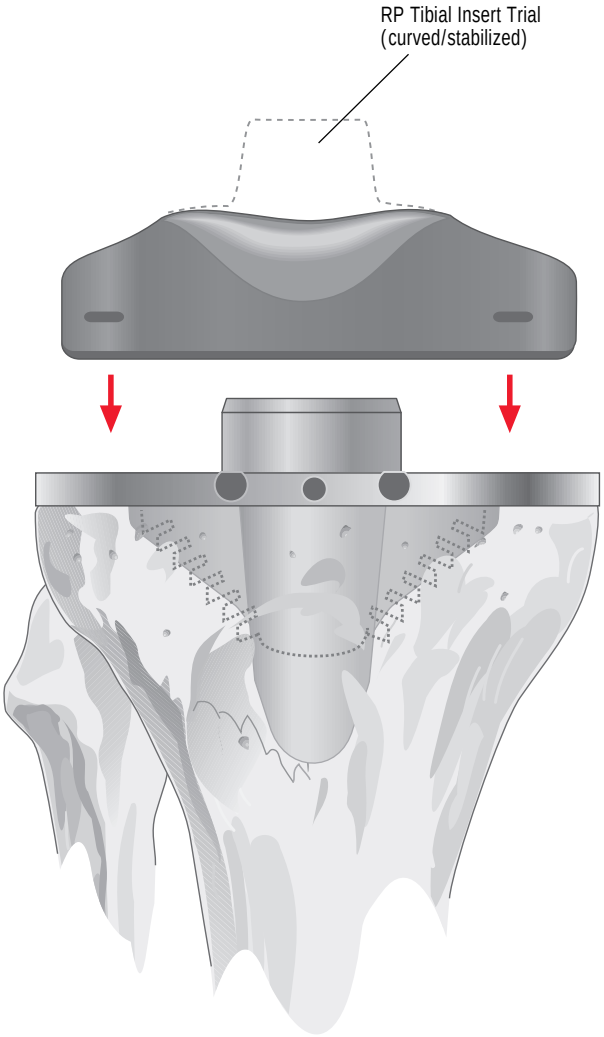
M.B.T. Tray *without* Keel Preparation

Assemble the universal handle to the appropriately sized M.B.T punch. Impact this assembly into the cancellous bone until the shoulder of the punch is in even contact with the M.B.T. tray trial. Disconnect the universal handle, leaving the M.B.T punch in place. [*fig. 57*]



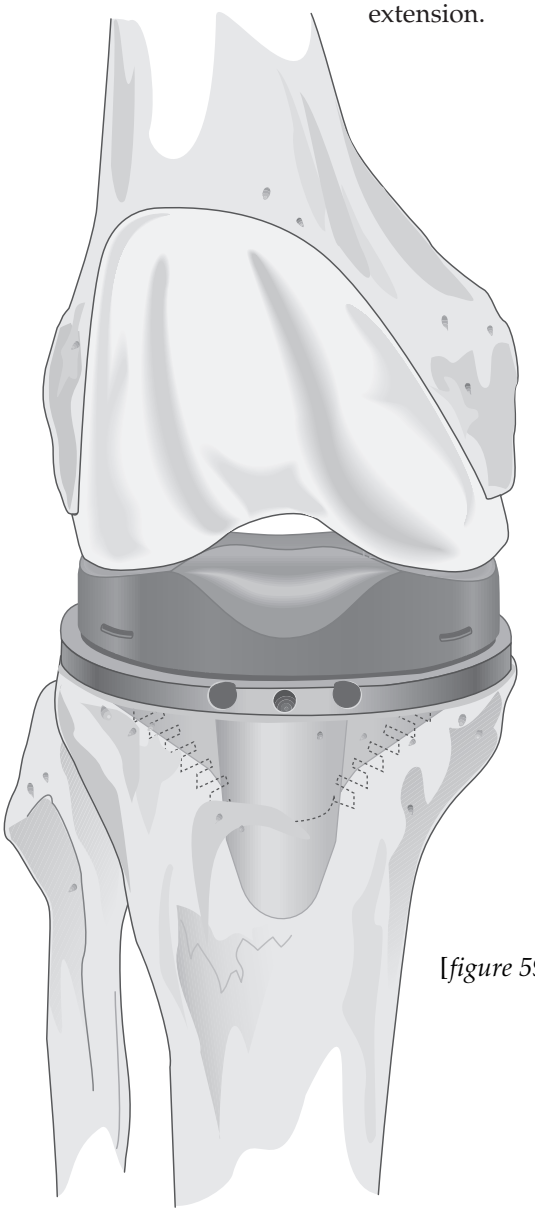
[*figure 57*]

Select the tibial insert trial that **matches the chosen femoral size and style**, curved or stabilized, and insert it onto the M.B.T. tray trial. [*fig. 58*]



[*figure 58*]

With the trial prostheses in place, fully extend the knee carefully [*fig. 59*], noting the anteroposterior stability, medial/lateral stability and overall alignment in the A/P and M/L plane. If there is any indication of instability, substitute a tibial insert trial with the next greater thickness and repeat reduction. Select the insert that gives the greatest stability in flexion and extension while still allowing full extension.

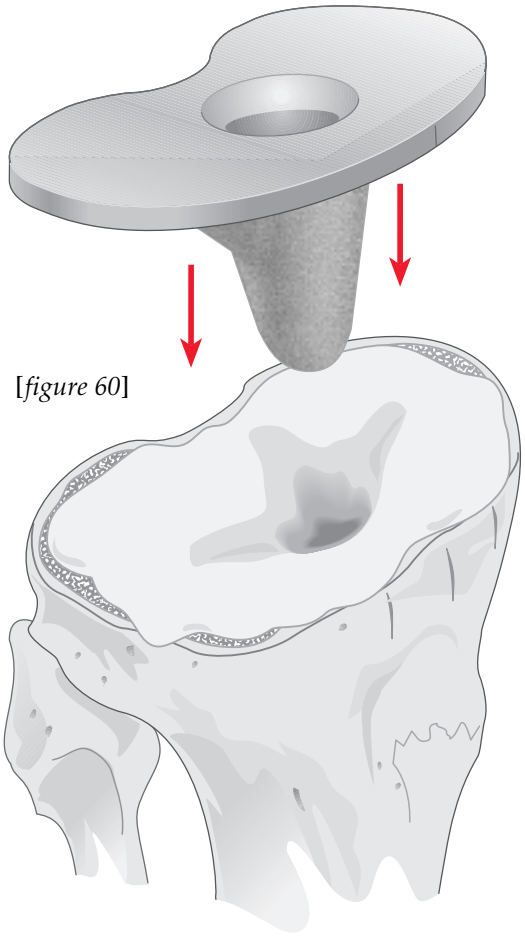


[*figure 59*]

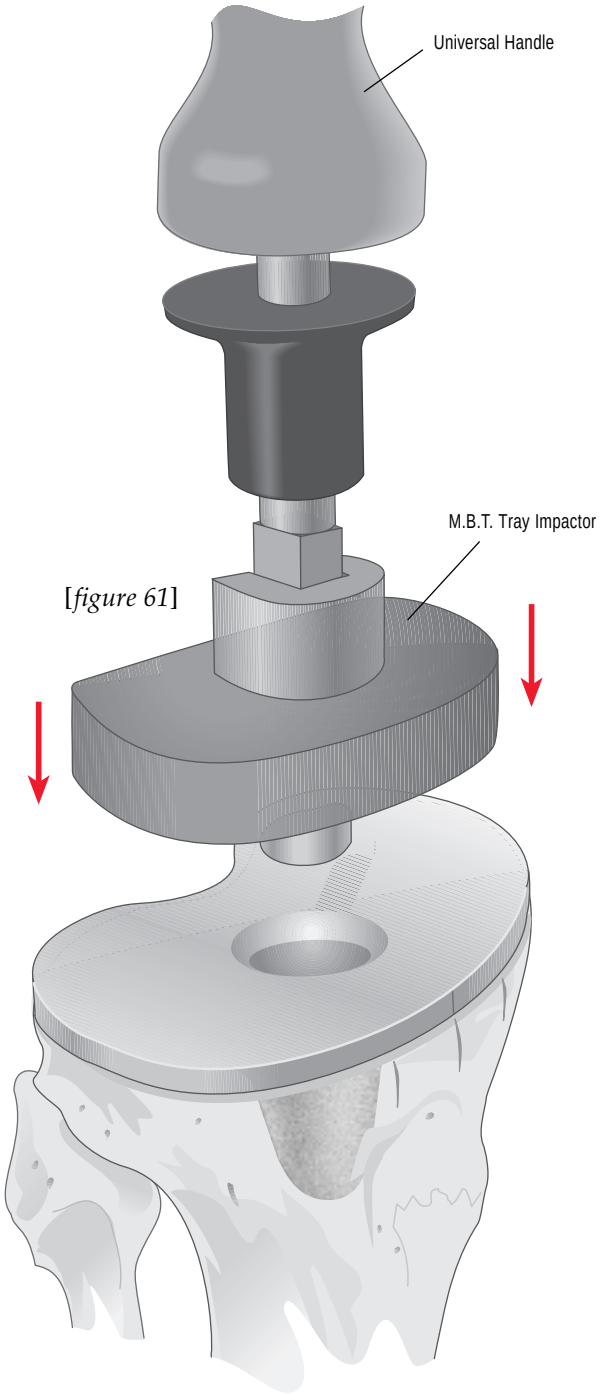
THE TIBIAL COMPONENT

Thoroughly cleanse the entire site with pulsatile lavage. Prepare bone cement and apply it by syringe or with digital pressure in its low viscous state to assure maximal penetration into the trabecular bone. [*fig. 60*]

Assemble the universal handle onto the M.B.T. tray impactor and carefully insert the tibial tray, avoiding malrotation. When fully inserted, deliver several mallet blows to the top of the universal handle. [*fig. 61*]

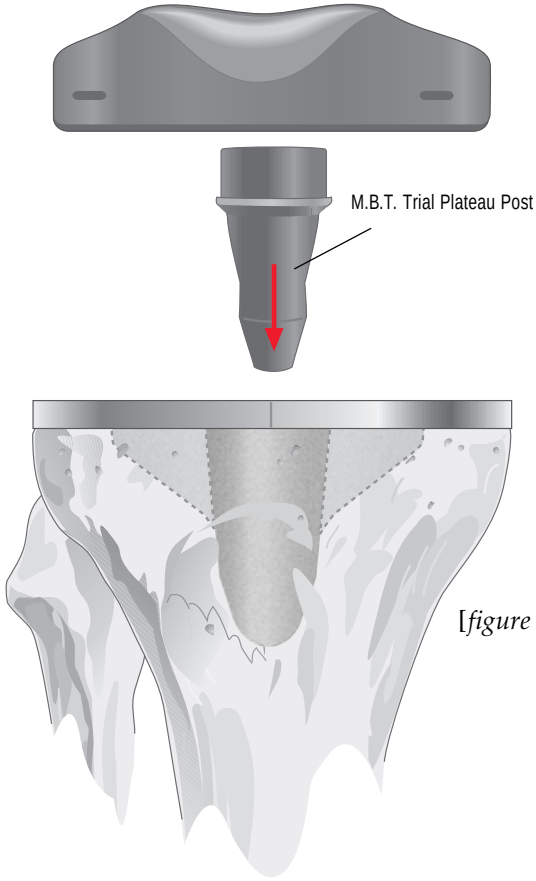


[*figure 60*]

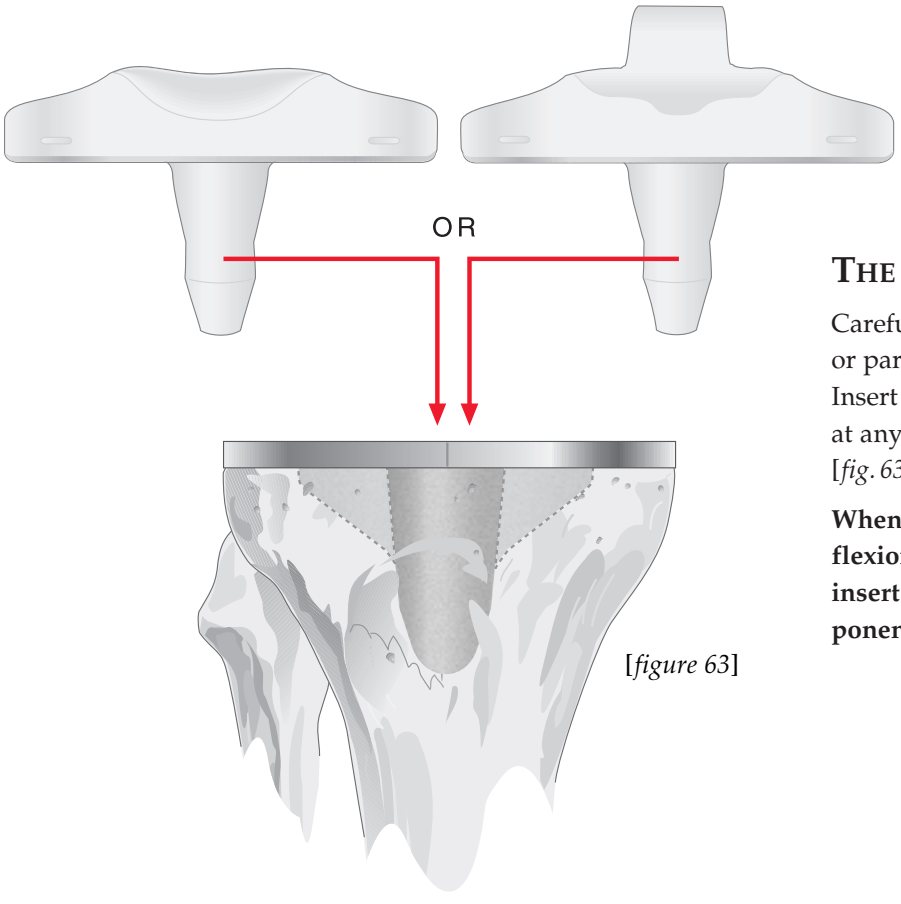


[*figure 61*]

As the cement polymerizes, position a trial femoral component on the prepared femur and place a tibial insert trial on the tibial component. To avoid an abnormally high anterior moment on the tray implant while the cement polymerizes, do not use the M.B.T. trial plateau post. Take care to avoid scratching the proximal surface of the tibial tray. Place the knee in full extension and maintain equal pressure at the bone/tibial implant interface. When the cement has set, place the knee in flexion and remove the trial femoral component. Carefully remove all extruded cement with special attention to the posterior compartment and entire periphery. To perform a trial reduction with an insert trial, place the M.B.T. Trial Plateau Post into the tibial tray component and place the insert trial over this post and proceed with the trial reduction. [*fig. 62*]



[*figure 62*]



[*figure 63*]

The Tibial Insert

Carefully clear/remove any loose fragments or particulates from the permanent tibial tray. Insert the appropriate permanent tibial insert at any time during the cementing procedure. [*fig. 63*]

When using a curved insert only and the flexion gap is snug, implant the permanent insert prior to cementing the femoral component.

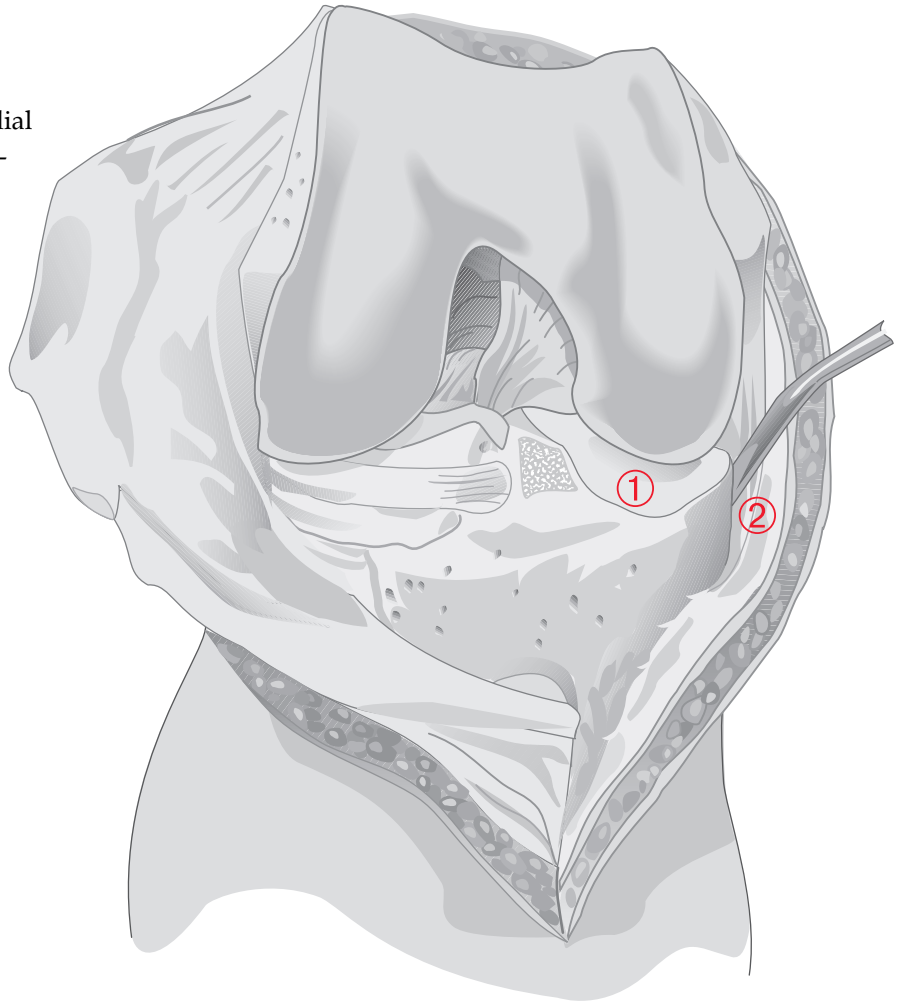
Ligamentous Balance in Total Knee Arthroplasty

Following is the suggested sequence of ligamentous releases to correct varus or valgus deformity and quadriceps-mechanism imbalance. There is no general agreement on the order; however, there is on principles:

- Perform preliminary soft tissue release at the start of surgery based upon preoperative evaluation.
- Establish balance by eliminating soft tissue contractures, not by modifying the bone cuts.
- Establish final correction at trial reduction.

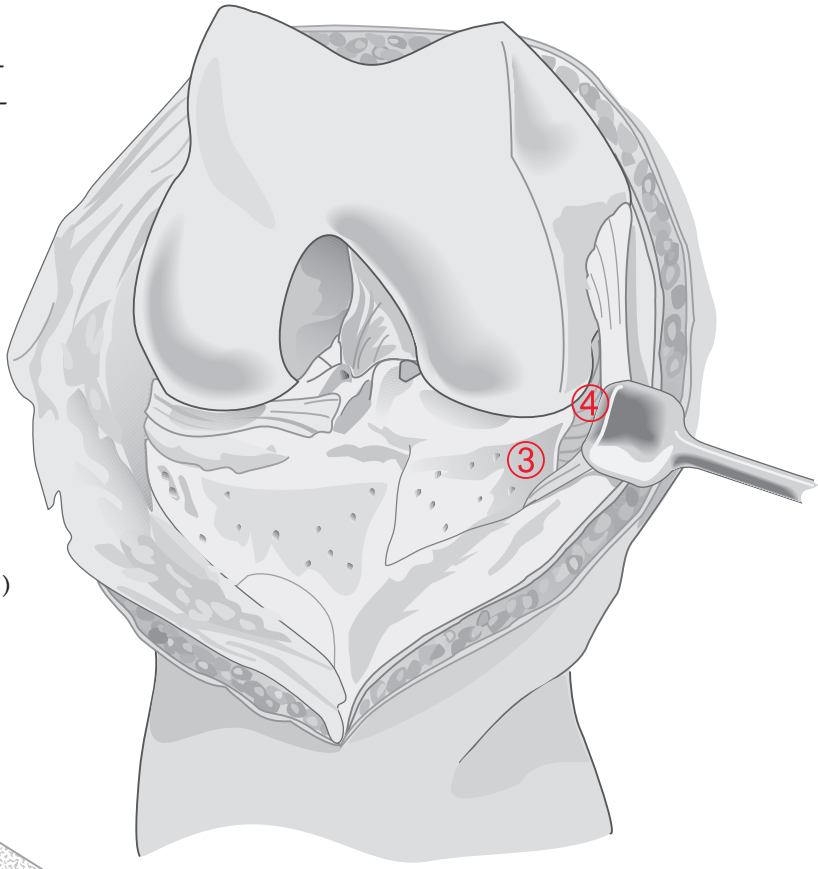
Medial Ligamentous Release for Fixed Varus Deformity

After removing peripheral osteophytes, excise the medial meniscus (1) and the menis-cotibial ligament (2).
In rheumatoid arthritis and minimal deformity, this is often sufficient.

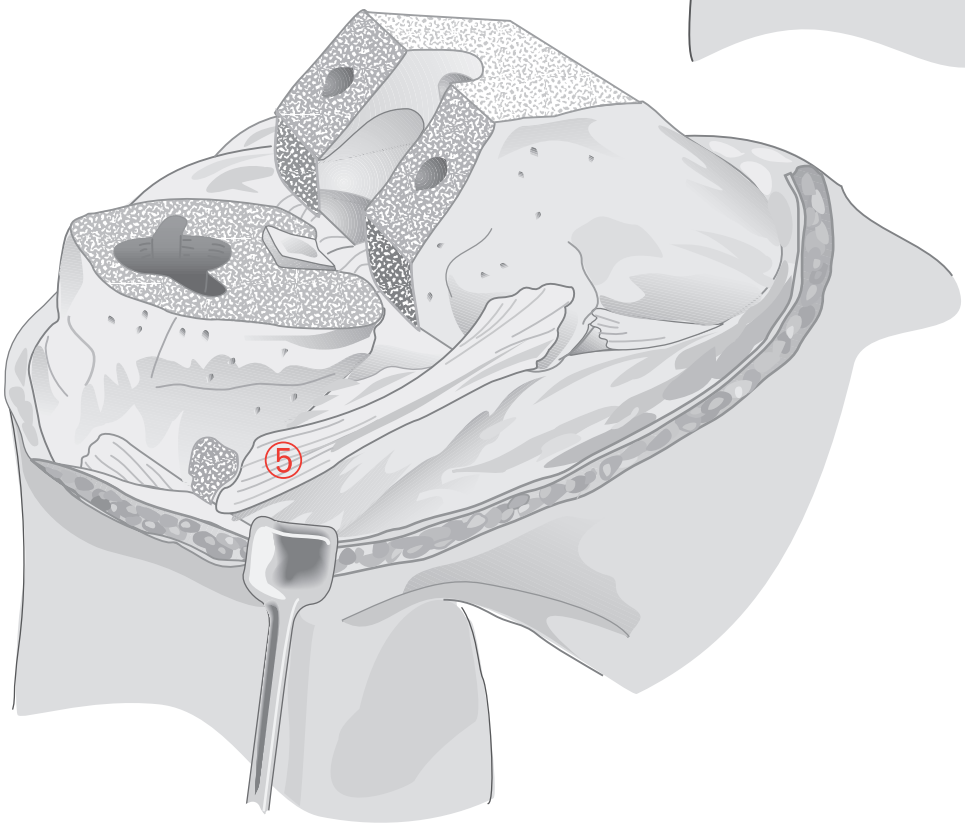


If further release is indicated, release the posterior expansion of the deep medial collateral ligament from its tibial attachment (3) using a curved osteotome.

If further release is still indicated, denude the medial tibial subperiosteally (4).

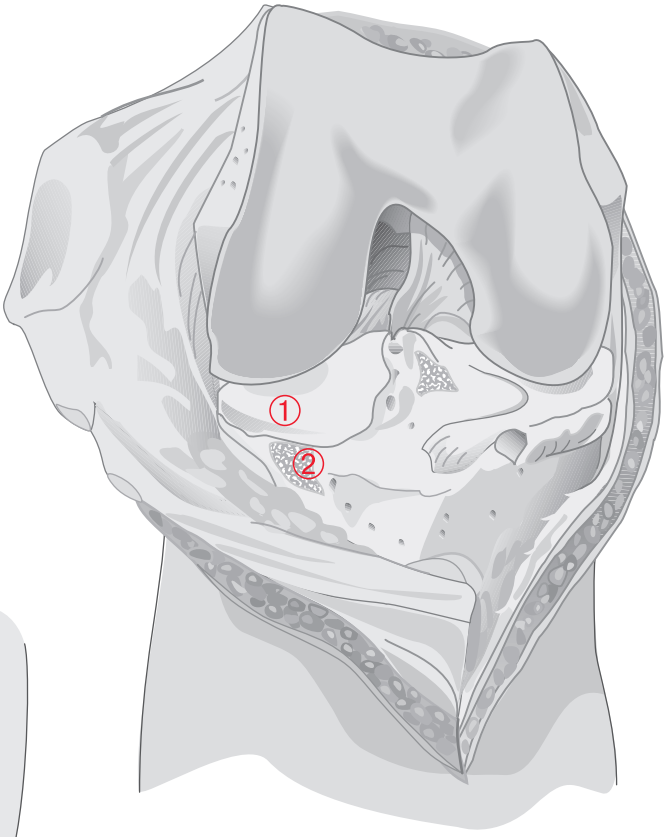


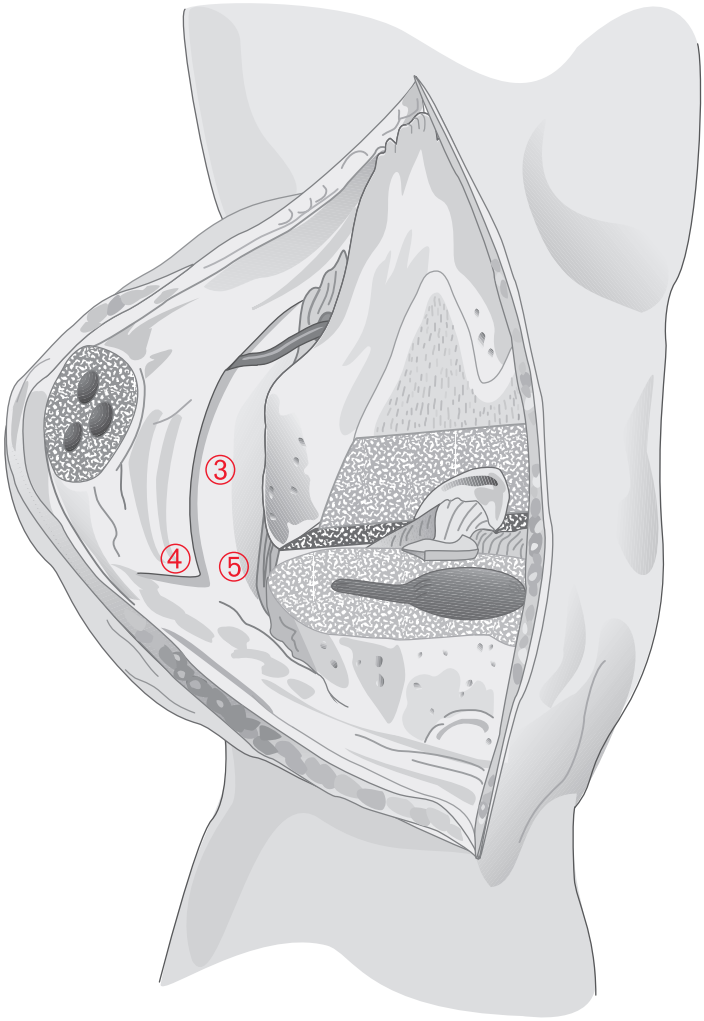
Release the superficial portion of the medial collateral ligament from its tibial attachment (5) if further release is still indicated. Generally, this is indicated only in severe deformity associated with significant flexion contracture.



Lateral Ligamentous Release for Fixed Valgus Deformity

Following removal of peripheral osteophytes, initial release comprises lateral meniscectomy (1) and release of the iliotibial band from its tibial insertion (2). A lateral quadriceps retinacular release is indicated when there is poor patellar tracking at trial reduction.





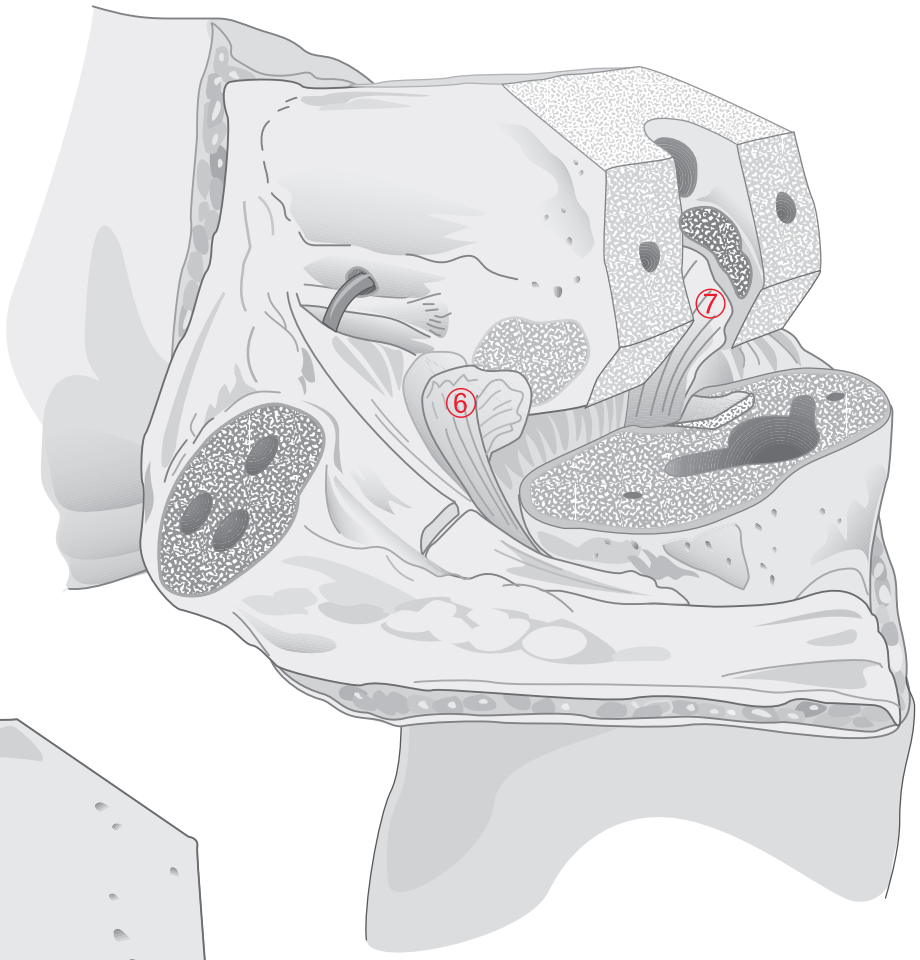
Perform lateral retinacular release on the internal surface in the longitudinal plane. Take care that the lateral superior genicular artery is protected. Isolate it at the intermuscular septum as it penetrates the retinaculum superficially. Then, retract it proximally as the retinacular incision is carried to the level of the joint line and distally as the incision is extended superiorly to the intermuscular septum (3).

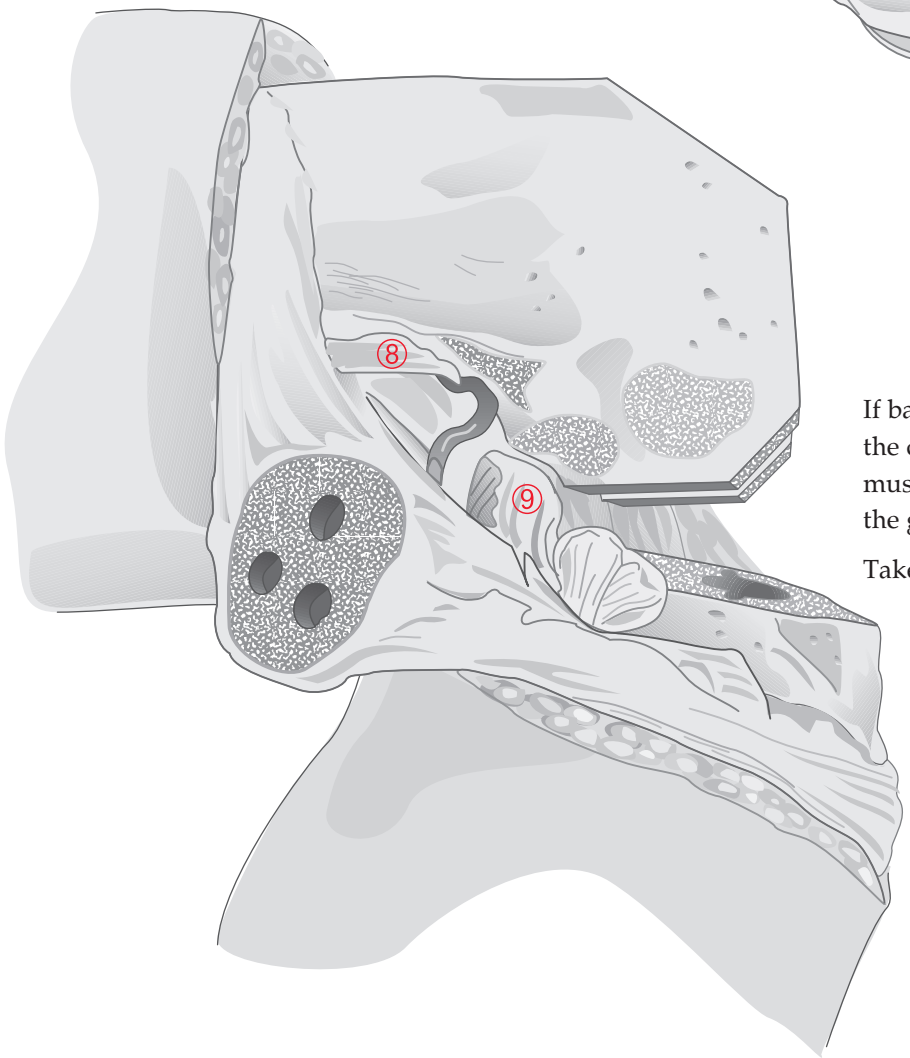
If indicated, further release is effected by extending the distal terminus of the incision transversely to the lateral margin of the patellar tendon (4) and posteriorly to the lateral collateral ligament (5).

If further release is once again indicated, release the lateral collateral ligament and popliteus tendon from the femoral epicondyle, allowing them to slide posteriorly (6).

If further release is indicated, evaluate the posterior cruciate ligament and, if necessary, sacrifice it (7).

Note: Priority of steps 6 and 7 is a matter of preference.

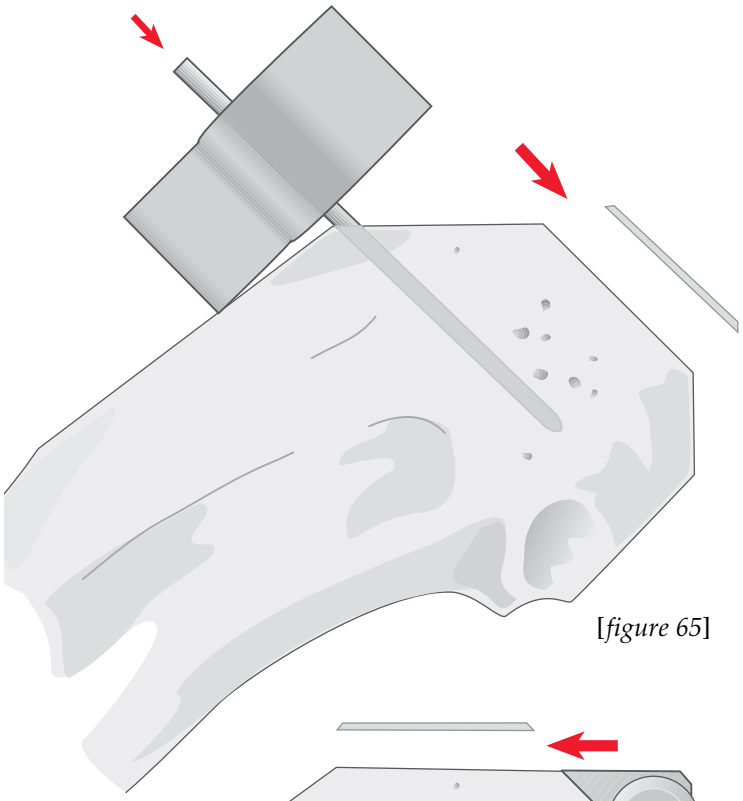




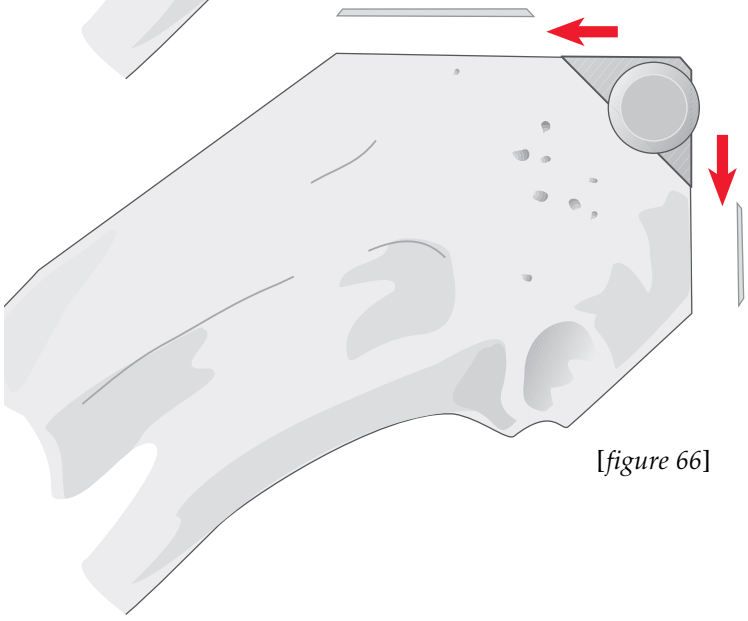
If balance requires still further release, extend the dissection posteriorly, freeing the intermuscular septum (8) and the lateral head of the gastrocnemius (9).

Take care that the posterolateral neurovascular structures are preserved and that the insertion of the *biceps femoris*, which overlies the common peroneal nerve, remains intact.

If the joint line is maintained, flexion and extension gaps are usually balanced at trial reduction, but where there is preoperative deformity and contracture, imbalance may be present.



[*figure 65*]

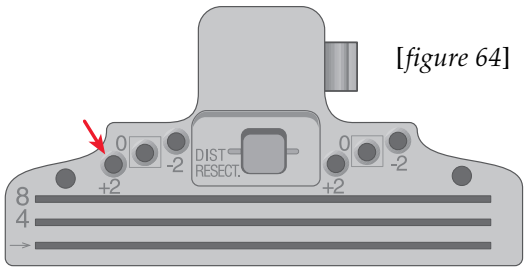


[*figure 66*]

RESIDUAL FLEXION CONTRACTURE

Where there is restriction in extension but not in flexion, remove additional bone from the distal femur. This affects the extension gap but not the flexion gap. Where contracture persists, following appropriate retinacular release and removal of posterior osteophytes and scar tissue, depending on severity, remove an additional 2-4 mm of distal femur.

Return the Steinmann pins to their original position in the anterior femur and return the distal femoral cutting block to the pins using the holes designated +2 as the degree of contracture indicates. Revise the distal cut accordingly. [*figs 64* and 65]

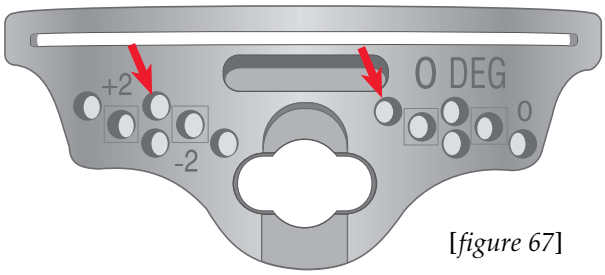


[*figure 64*]

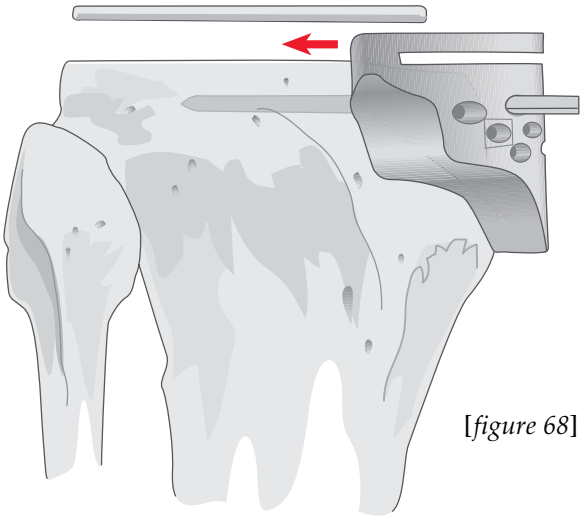
Chamfers are subsequently revised to maintain the correct configuration; [*fig. 66*] anterior and posterior cuts are not. This affects ligamentous tension in extension but not in flexion.

Residual Tightness in Flexion and Extension

A thinner tibial insert or additional tibial resection is indicated, as either will affect both flexion and extension gaps. If resection is selected, it is recommended that 2 mm of proximal tibia be removed. Return the Steinmann pins to their drill holes in the anterior tibial cortex, and reposition the cutting block on the pins using the holes designated +2. [*fig. 67*] Accordingly revise the cut. [*fig. 68*]



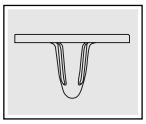
[*figure 67*]



[*figure 68*]

ROTATING PLATFORM KNEE SYSTEM
TIBIAL INSERT & TIBIAL TRAY COMPATIBILITY

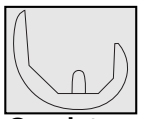
ROTATING PLATFORM TIBIAL INSERTS
MATCH FEMORAL COMPONENTS SIZE-TO-SIZE



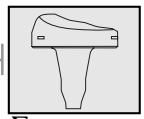
MOBILE BEARING TIBIAL (M.B.T.) TRAY *SIZING • AP/ML (mm)*

P.F.C. SIGMA RP TIBIAL INSERTS *SIZING • AP/ML (mm)*

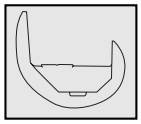
		1.5 41/62	2 43/65	2.5 44/67	3 46/70	4 49/75	5 53/81	6 57/87	7 60/92
2 39/61	CURVED	■	■	■					
	STABILIZED	■	■	■					
2.5 40/64	CURVED		■	■	■				
	STABILIZED		■	■	■				
3 42/66	CURVED			■	■	■			
	STABILIZED			■	■	■			
4 44/69	CURVED				■	■	■		
	STABILIZED				■	■	■		
5 47/74	CURVED					■	■	■	
	STABILIZED					■	■	■	
6 50/79	CURVED						■	■	■
	STABILIZED						■	■	■



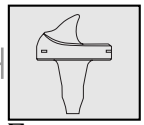
Cruciate Retaining



Σ RP Curved
10, 12.5, 15, 17.5 (mm)



Cruciate Substituting



Σ RP Stabilized
10, 12.5, 15, 17.5 (mm)

INDICATIONS FOR USE WITH CEMENT
The LCS® Complete – P.F.C. Sigma RP Mobile Bearing Knee System is indicated for cemented use in cases of osteoarthritis and rheumatoid arthritis. The rotating platform prosthesis and modular revision components are indicated for revision of failed knee prostheses.

INDICATIONS FOR USE WITHOUT CEMENT
The porous coated Keeled and Non Keeled M.B.T. (Mobile Bearing Tibial) Tray configurations of the LCS Knee System are indicated for noncemented use in skeletally mature individuals undergoing primary surgery for reconstructing knees damaged as a result of noninflammatory degenerative joint disease (NIDJD) or either of its composite diagnoses of osteoarthritis and post-traumatic arthritis pathologies. The Rotating Platform device configuration is indicated for use in knees whose anterior and posterior cruciate ligaments are absent or are in such condition as to justify their sacrifice.

CONTRAINDICATIONS
The use of the LCS Complete – P.F.C. Sigma RP Mobile Bearing Knee System is contraindicated in patients with:
- The presence of active infection within the knee joint or at any other site,
- Loss of function that could affect rehabilitation,
- Severe osteoporosis or other metabolic bone diseases of the knee,
- Metabolic or systemic disorders or lesions affecting solidity of bony support,
- Severe instability due to bone/supporting ligament loss,
- Known drug or alcohol addiction,
- Skeletally immature,
- Known metal/plastic allergies.

Noncemented use is contraindicated in patients with inadequate bone stock or vascular deficiencies that compromise positioning and stability of the implant.

WARNINGS
Familiarity with the system, proper size selection, the choice of and careful use of the components and the use of trial prostheses are imperative. Failure to use the optimum size implant, failure to adequately seat the component adjacent to adequate bone and failure to ensure that the component is stable may result in dislocation, subsidence, fracture or loosening of the components. System components must not be used together with those of another manufacturer. A postoperative management program is vital. The safety and effectiveness of the cemented use of the LCS Knee in patients under 41 years of age have not been established. The safety and effectiveness of the noncemented use of the M.B.T. tray device configurations in patients under 50 years of age have not been established. The safety and effectiveness of the noncemented use of the M.B.T. tray device configurations for indications other than noninflammatory degenerative joint disease (NIDJD) and in bilateral applications have not been established.

Caution: Federal Law (USA) restricts these devices to sale by or on the order of a physician.

For more information about the P.F.C. Sigma RP, visit our web site at www.mobilebearingknees.com

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