M.B.T. Revision Tray

SURGICAL TECHNIQUE

DePuy

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Contents

M.B.T. Revision Knee Surgery

Introduction

In total knee arthroplasty, failure may result from wear, aseptic loosening, infection, osteolysis, ligamentous instability, arthrofibrosis or patellofemoral complications. In approaching revision procedures, the surgeon must consider the incision in a previously operated site, the condition of the soft tissue, mobilization of the extensor mechanism, extraction of the primary prosthesis and the conservation of bone stock. Among the goals of revision arthroplasty are the restoration of anatomical alignment and functional stability, fixation of the revision implants and accurate re-establishment of the joint line. Careful selection of the appropriate prosthesis is important. Ideally, the revision knee replacement system will offer the options of adjunctive stem fixation, methods to manage bone loss and various levels of prosthetic constraint.

Preoperative Planning

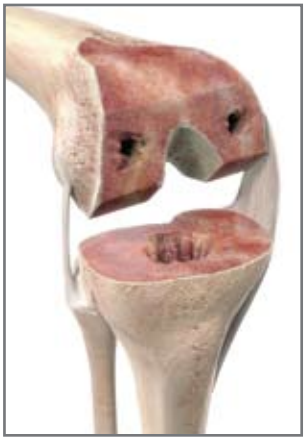
Revision total knee arthroplasty begins with thorough clinical and X-ray evaluation. Physical evaluation includes examination of soft tissues, previous skin incisions, range of motion, motor strength, condition of all neurovascular structures, ligamentous stability and the integrity of the extensor mechanism.

Obtain biplanar radiographic and tangential views of the patella and full-length standing bilateral extremity views to assess alignment and bone stock, documentation of the joint line and evaluation of the present implant fixation. Stress views are helpful in evaluating ligamentous instability. CAT and MRI scans may be of value in cases of massive bone loss or substantial anatomic distortion from trauma and metabolic bone disorders. Templates are used to establish replacement implant size and the alignment of bone cuts, as well as plan for augments or metaphyseal filling sleeves that might be needed to manage bone loss and restore the joint line.

The M.B.T. Revision Knee System Is Comprised of the Following Components:

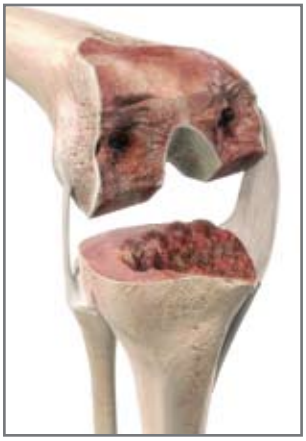
- 8 sizes of tibial components available
- Five sizes of stepped metaphyseal filling and loading sleeves
- Tibial Wedge Augmentation Components: Step Wedge in 5, 10 and 15 mm thicknesses
- 75, 115 and 150 mm Fluted Tibial Stem lengths in 10 to 24 mm diameters in 2 mm increments
- 30, 60 and 90 mm Cemented Tibial Stem lengths in 13 mm diameter
- Accepts rotating platform inserts from LCS® Complete™, P.F.C.® Sigma™ RP, LCS Complete Revision and Sigma TC3 RP inserts
- Accepts rotating platform hinged insert from the Orthogenesis LPS™ (Limb Preservation System), which is compatible with the S-ROM® Noiles™ Rotating Hinge (NRH) femoral component and LPS femoral component

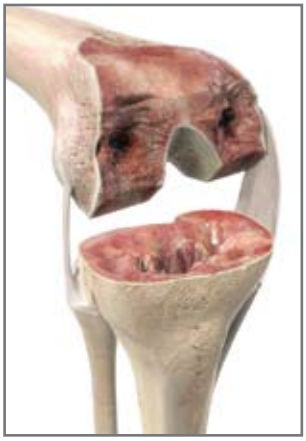
Type 1
T1 Tibia/F1 Femur



- Localized defect: cortical rim intact
- Near normal joint line
- Often requires small amounts of bone graft

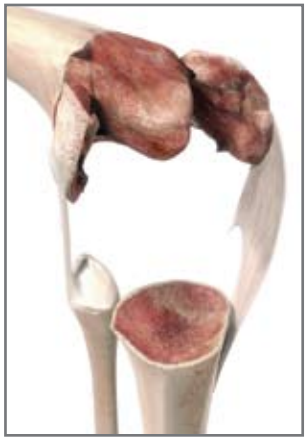
Type 2
T2 Tibia/F2 Femur





- Cortical rim intact
- Central or peripheral metaphysis loss
- Requires cement fill, cancellous bone graft, augments or sleeves to restore joint line.

Type 3
T3 Tibia/F3 Femur



- Loss of entire metaphysis and cortex
- Requires structual bone graft, hinged implant, sleeve or custom component
- Compromised ligaments

Initial Incision

Where possible, follow the scar from the primary procedure. [Fig. 1] Where parallel incisions are present, use the most lateral incision, as the blood supply to the extensor surface is medially dominant. Where a transverse patellectomy scar is present, transect the incision at 90 degrees. Where there are multiple incision scars or substantial cutaneous damage (burn cases, skin grafting, etc.), consider consulting a plastic surgeon prior to surgery to design the incision, determine the efficacy of preoperative soft tissue expansion and plan for appropriate soft tissue coverage at closure.

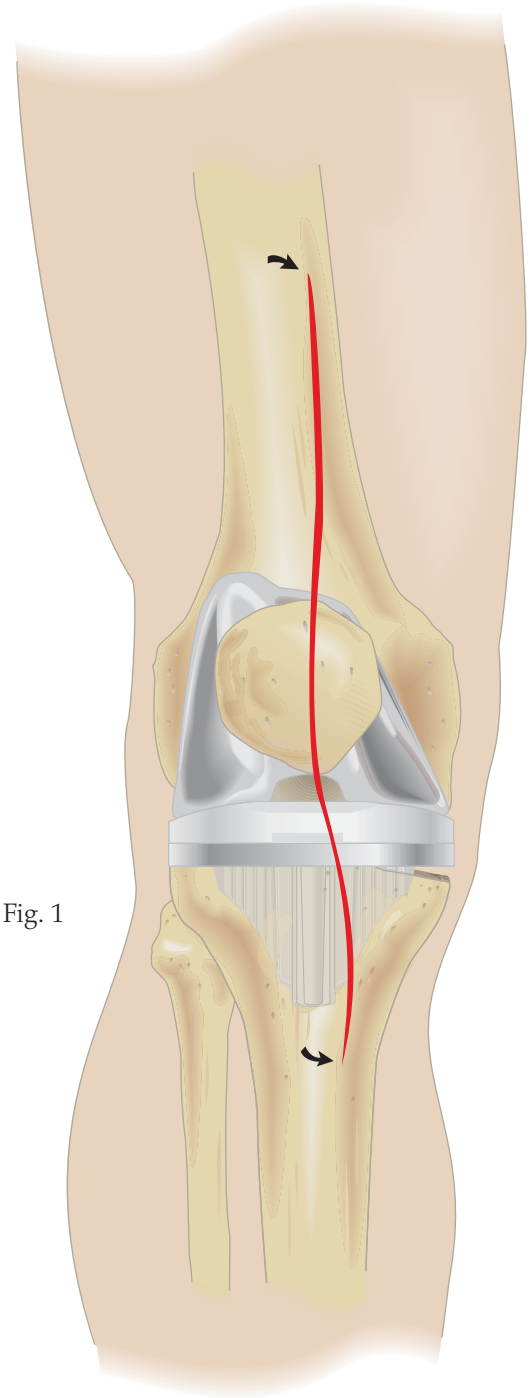


Fig. 1

Capsular Incision

Extend the fascial incision from the proximal margin of the rectus femoris to the distal margin of the tibial tubercle following the medial border of the patella. Maintain a $\frac{1}{8}$ in. (3.2 mm) cuff for reapproximation of the vastus medialis aponeurosis at closure. [Fig. 2] Where mobilization of the extensor mechanism and patella is problematic, extend the skin and capsular incisions proximally.

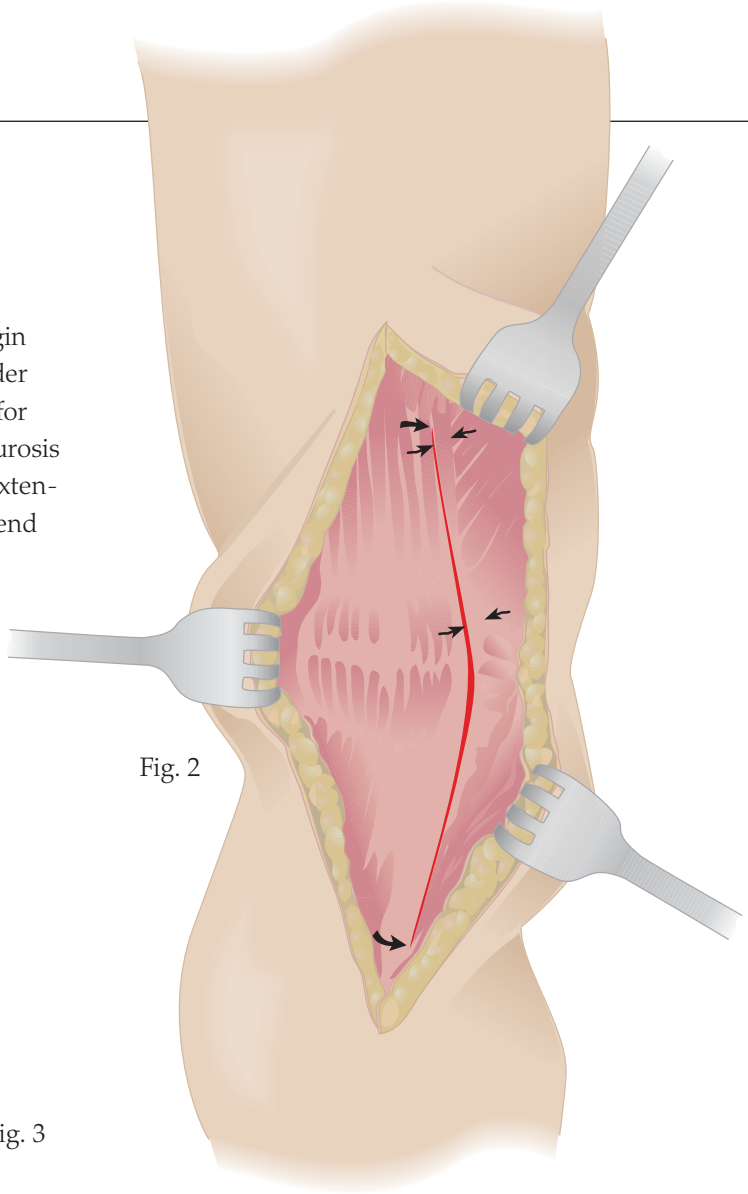


Fig. 2

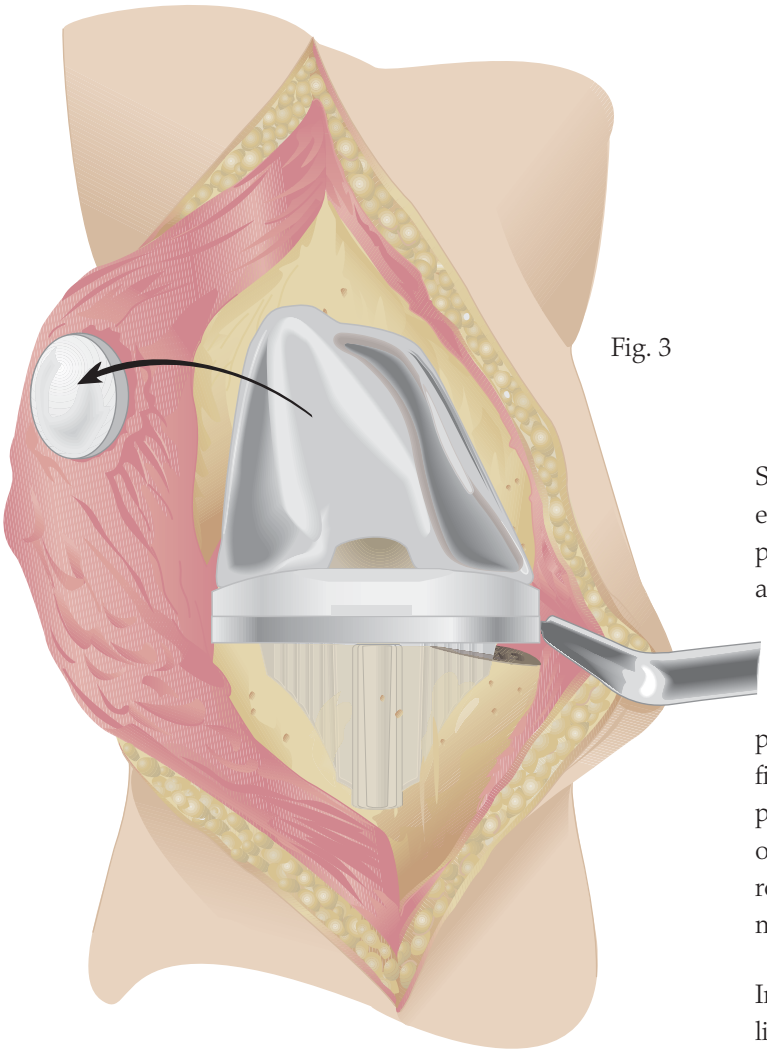


Fig. 3

Sublux patella into lateral gutter. Occasionally, an early lateral retinacular release is indicated to assist patellar eversion. Where eversion difficulties persist, a quadriceps snip, a proximal inverted quadriceps incision (modified V-Y) or a tibial tubercle osteotomy may be indicated. Perform the appropriate ligamentous release based on preoperative and intraoperative evaluation. Release fibrous adhesions to re-establish the suprapatellar pouch and medial and lateral gutters. To subluxate or dislocate the tibia forward and into external rotation, release the tissues attached to the proximal medial tibia. [Fig. 3]

In many revision cases, the posterior cruciate ligament will be absent or nonfunctional; excise any residual portion.

Establish two anatomic conditions to facilitate revision arthroplasty: the level of the joint line and the disparity in the flexion and extension gaps.

Joint Line Evaluation

An average knee in full extension will approximate the true joint line by referencing several landmarks [Fig. 4]:

(A) 12 to 16 mm distal to the femoral PCL attachment

(B) Approximately 3 cm distal to the medial epicondyle and 2.5 cm distal to the lateral epicondyle

(C) Distal to the inferior pole of the patella (approximately one finger width)

(D) Level with the old meniscal scar, if available

Additional preoperative joint line assessment tools include:

1. Review of original preoperative X-ray of the total knee arthroplasty (TKA)
2. Review of X-ray of contralateral knee if not implanted to determine correct size of femoral implant and subsequently the proper joint line in flexion

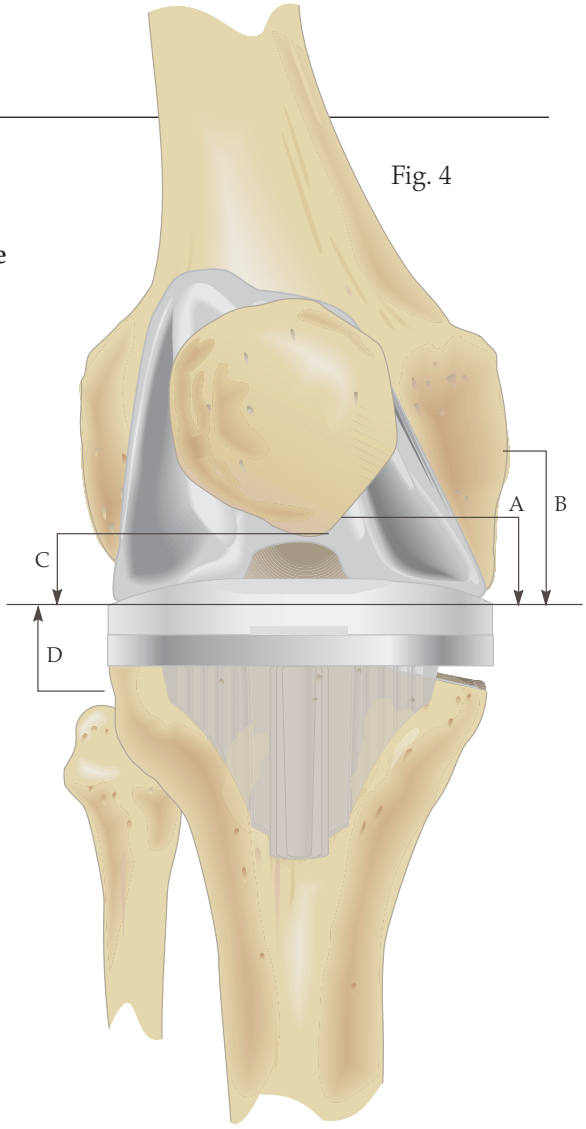


Fig. 4

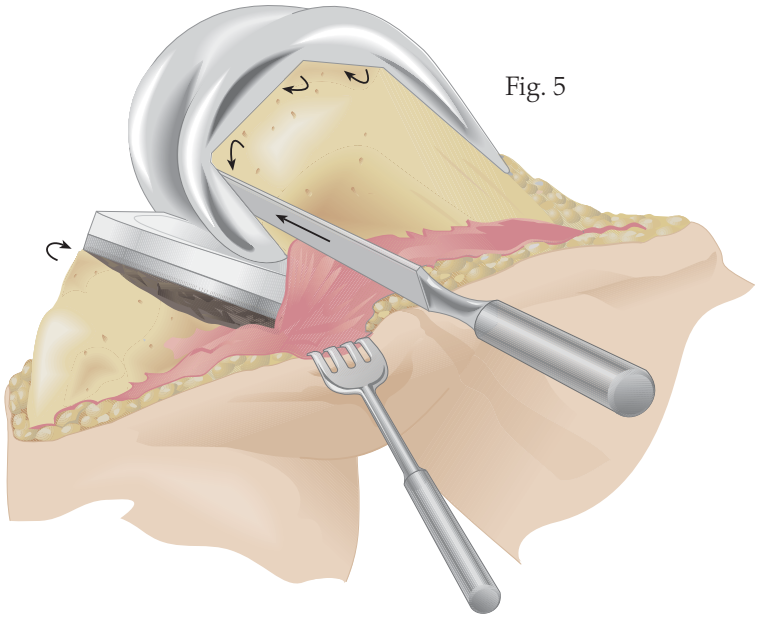


Fig. 5

Extraction of Implants from the Primary Procedure

Preserve as much bone as possible. Assemble a selection of tools, including thin osteotomes, an oscillating or microsagital saw, a high-speed burr and various extraction devices.

Carefully disrupt the bone/cement or bone/prosthesis interface before extraction is attempted. Disengage and extract the implanted components as gently as possible to avoid fracture and unnecessary sacrifice of bone stock. To replace the entire prosthesis remove the femoral component first, as this will enhance access to the tibia. Clear all residual methyl methacrylate with chisels or power tools. [Fig. 5]

Joint Space Assessment

Evaluate the joint space with spacer blocks to determine the flexion/extension gap relationship and the symmetry of both the flexion and extension gaps [Figs. 6 and 7], and to indicate if prosthetic augmentation is needed to ensure postoperative balance.

Size the tibia first, then size the femoral component (selecting the same size femoral component). This can be adjusted to accommodate the following situations:

FLEXION GAP >EXTENSION GAP:

To decrease the flexion gap without affecting extension gap, use a larger femoral component. This is particularly important where an I.M. stem extension is indicated, as the stem extension will determine the anteroposterior positioning of the component and the subsequent flexion gap.*

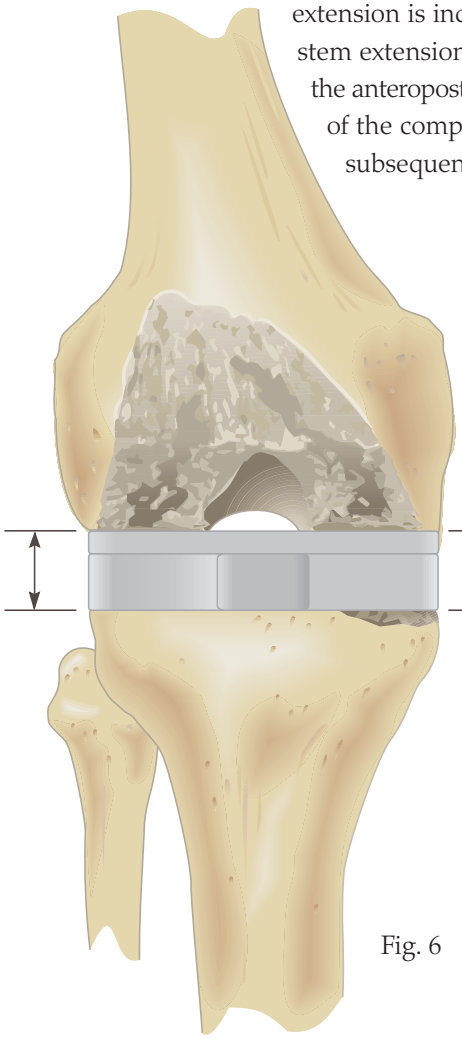


Fig. 6

*If a lateral X-ray of the preoperative knee is available, templating the appropriate size will be very helpful in choosing the appropriate femoral implant size.

When the joint line is elevated, the preferred correction is posterior and distal femoral augmentation with a larger femoral component. The alternative—additional distal femoral resection and use of a thicker tibial insert to tighten the flexion gap—is not recommended as considerable bone stock has been sacrificed in the primary procedure. It is important to avoid additional resection of the distal femur, except where the joint line is not elevated and minimal distal resection will increase the extension gap toward equivalency with the flexion gap.

EXTENSION GAP >FLEXION GAP:

To decrease the extension gap without affecting flexion gap, augment the distal femur with bone graft or prosthetic augmentation.

Note: *This will lower the joint line and lessen the incidence of postoperative patella infera which is usually desirable. The joint line is generally found to be elevated in revision cases. This will lessen the incidence of postoperative patellar infera.*

Fig. 7

The Tibial Alignment System

When preoperative evaluation and X-rays indicate that fluted stem extensions, metaphyseal sleeves or wedges are required, it is recommended that the proximal tibia be prepared with reference to the position of the I.M. Rod.

Where a cemented tibial stem extension is indicated, see Appendix I (page 18).

Place the knee in maximal flexion with the patella laterally everted and the tibia distracted anteriorly and stabilized. Release fibrosis around the tibial border or excise as required to ensure complete visualization of its periphery.

Approximate the location of the medullary canal with reference to preoperative anterior/posterior (A/P) and lateral X-rays and to the medial third of the tibial tubercle.

Introduce a $^{5}/_{16}$ in. (9 mm) drill into the canal to a depth of 2 to 4 cm. Avoid cortical contact. [Figs. 8 and 9]

Fig. 8

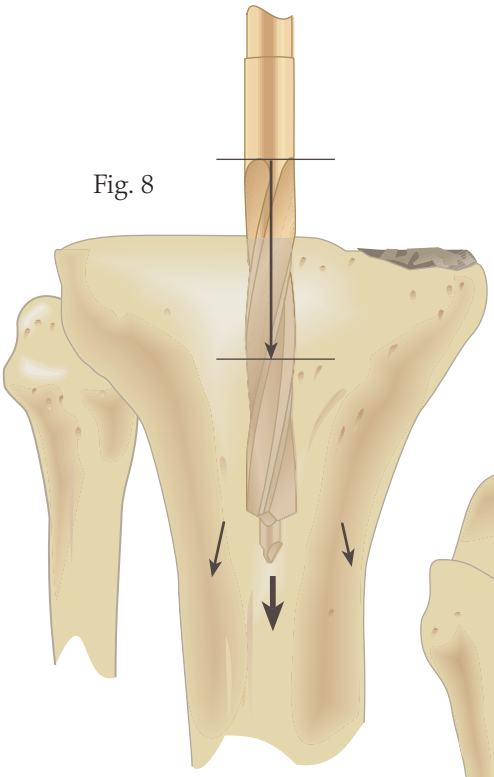
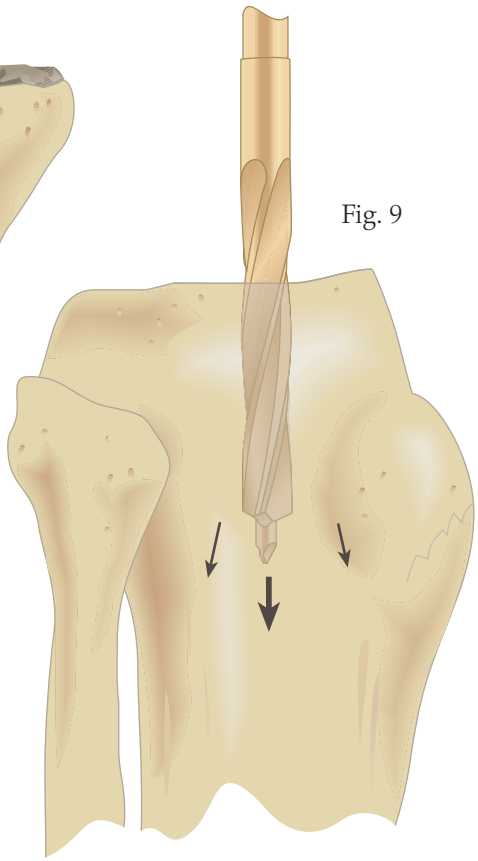


Fig. 9



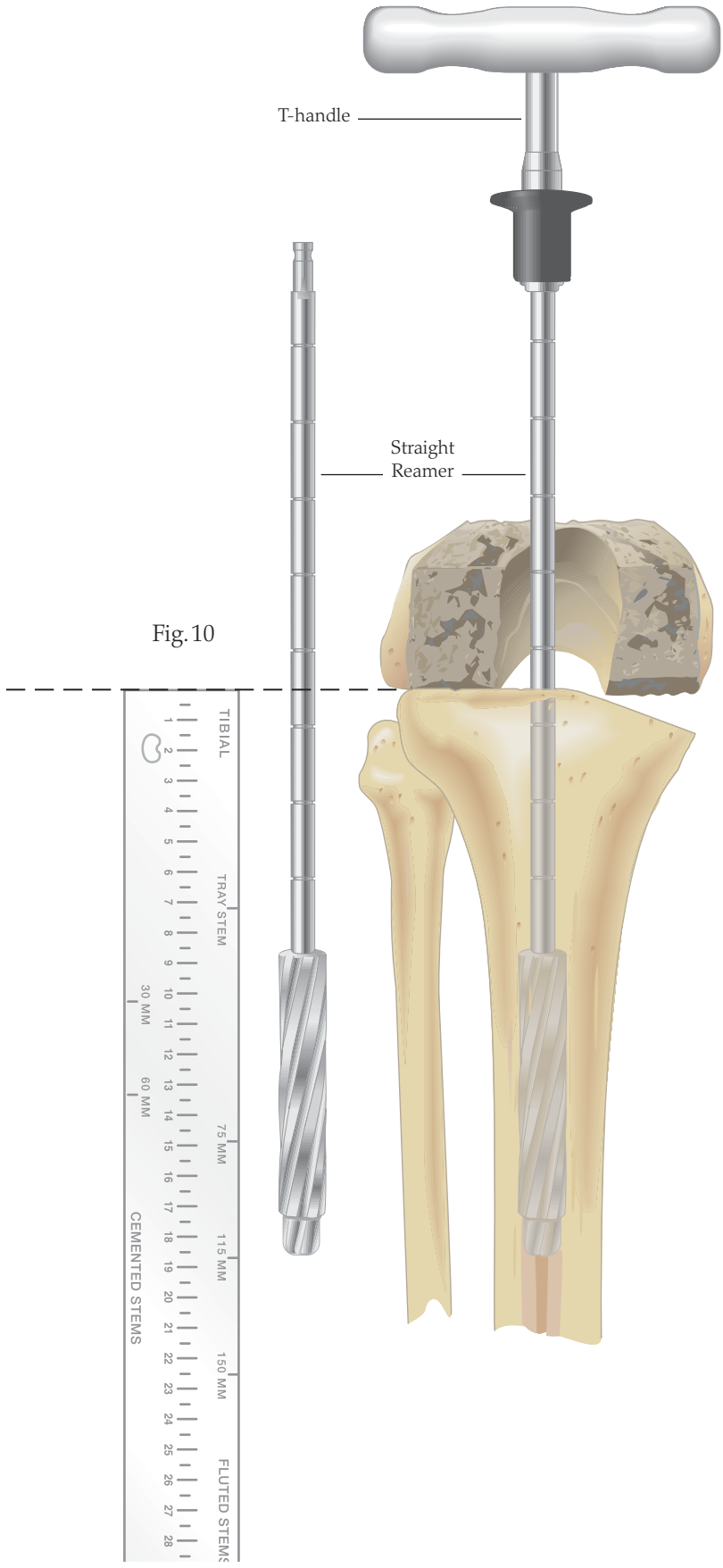


Fig. 10

Reaming the Medullary Canal

Assemble the straight reamer to the T-handle. If power reaming, it will be necessary to attach the modified Hudson adaptor to the straight reamer. The shaft of the reamer contains markings in 1 in. (25.4 mm) increments. Fluted tibial stem lengths are available in 75, 115 and 150 mm. Determine the length and diameter of the prosthetic stem extension with templates (cat. no. 2178-30-100) applied to preoperative X-rays.

Utilizing the reamer depth scale and the markings on the straight reamer, ream to the pre-determined depth so the pre-selected marking on the reamer is positioned at the desired tibial resection level. Sequentially open the canal with progressively larger reamers until firm endosteal engagement is established. [Fig. 10]

Note: *Simple cortical contact should not be construed as engagement.*

The fixed relationship of the reamer to the cortices ensures the secure fit of the appropriate reamer and, subsequently, the corresponding fluted stem. It is equally important to not overream osteopenic bone.

The size of the final reamer indicates the diameter of the implant stem. The fluted tibial stems are available in even sizes (10 through 24 mm). Perform final reaming with an even-sized reamer.

Refer to page 18 for cemented stem preparation.

For Diaphyseal Engaging Stem and Metaphyseal Filling Sleeve

Attach the appropriately sized stem trial to the end of the reamer.

Note: *Assembly of the stem trial may be aided by the pre-attachment of the T-handle.*

Taper ream to the planned proximal tibial resection level. [Fig. 11]

Note: *Use the "cemented" taper reamer when requiring a cement mantle or when utilizing a sleeve. Use the press-fit tapered reamer when line-to-line fit is desired and a sleeve will not be utilized.*

Note: *To avoid stem trial disengagement, do not reverse ream.*

At this point, intraoperatively determine if a metaphyseal sleeve will be used.

Note: *Metaphyseal sleeves are ideal to provide filling of Engh type II or III defects in revision TKA. The steps also provide progressive loading of the bone with porous coating, which enhances fixation.*

If a metaphyseal sleeve is selected, see page 12 in order to broach the metaphyseal bone.

If a metaphyseal sleeve will not be used, see page 10 to prepare for the proximal tibial resection.

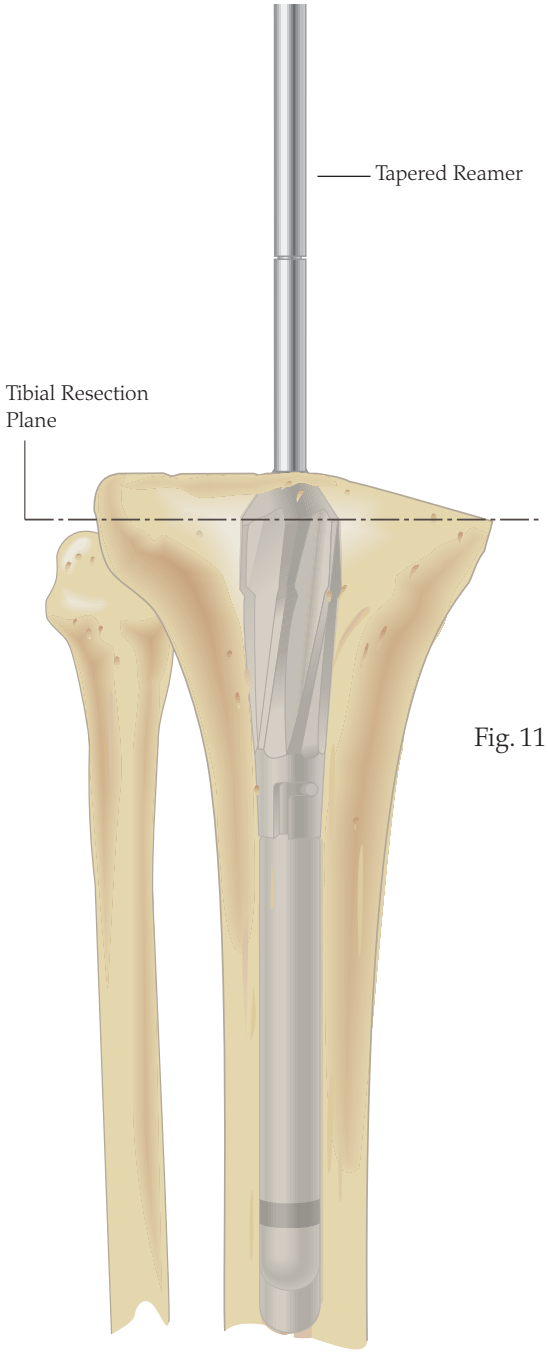


Fig. 11

Proximal Tibial Resection – Tapered Reamer

Attach the 2 degree tibial cutting block to the I.M. tibial referencing device. Attach the I.M. tibial referencing device to the shaft of the tapered reamer. Position the I.M. tibial referencing device with the pre-attached 2 degree cutting block onto the shaft and allow it to descend to the proximal tibial surface. Since considerable bone stock may have been sacrificed in the primary total knee arthroplasty (TKA), minimize the amount resected: no more than 1-2 mm from the most prominent condyle, managing residual defects of the contralateral condyle with either prosthetic augment or bone graft.

Resection is based on tibial deficiency and the level of the joint line. Compensate deficiencies with sleeves, wedges and/or bone grafts. Advance the cutting block to the anterior tibial cortex and lock into position by tightening the knurled knob on the outrigger. Preliminary rotational alignment is based on the medial third of the tibial tubercle. Secure the alignment device to the reamer shaft with the lateral setscrew. [Fig. 12]

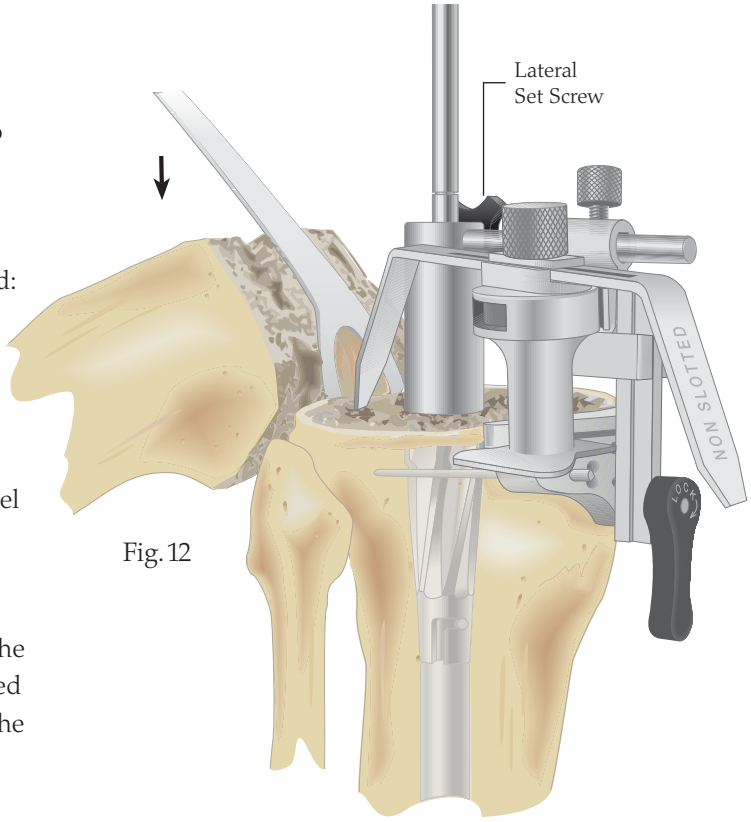


Fig. 12

Pin the tibial cutting block so a minimal resection is made from the proximal tibia. Utilize the stylus when necessary. [Fig. 12]

Note: *If a metaphyseal sleeve is to be used, tibial resection using the 2 degree tibial cutting device is unnecessary as the tibial resection will be performed using the tibial sleeve broach. (see page 11, Fig. 15)*

Note: *There is a slotted and non-slotted end to the stylus. The difference between the two is 5 mm.*

Remove the I.M. device while leaving the 2 degree cutting block in place. Remove the tapered reamer and resect the proximal tibia. [Fig. 13] (Maximum saw blade thickness 1.5 mm)

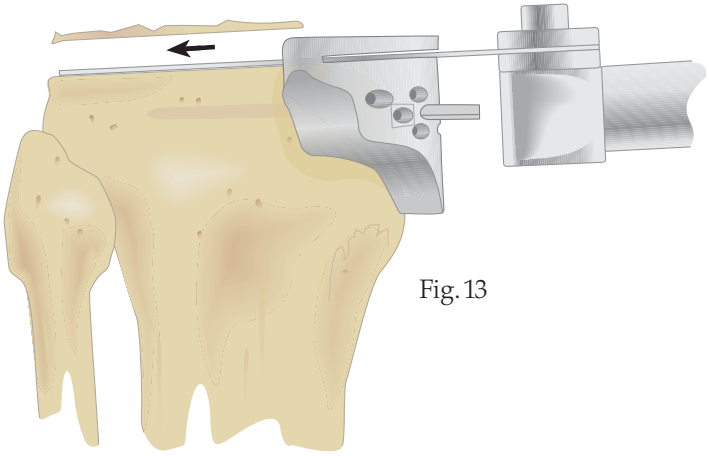


Fig. 13

Note: *At this point determine whether a step wedge is necessary on either the medial or lateral side to augment a defect, or both sides in order to restore the joint line. If a wedge is necessary on one side, it is recommended that the step wedge be prepared after rotational position of both the femoral and tibial components have been determined. For step wedge preparation see Appendix II (page 21).*

Optional For Sleeve Utilization Only

Note: The M.B.T. revision tibial tray will accept either a tibial metaphyseal sleeve or a tibial step wedge if using sleeve sizes 37, 45, 53 and 61 mm, but not both.

Attach the M.B.T. Revision Broach handle to the smallest broach and then attach the appropriately sized stem trial. The broaches are asymmetrical.

Position the "ANT" engraving on the broach anteriorly.

Insert the broach into, then out of, the tibia until the top surface of the broach is at the desired proximal tibial resection level. Check for rotational stability. If the broach is unstable or the defect is unfilled, repeat with consecutively larger broaches until the desired fit is achieved. [Fig. 14] Remove the broach handle, leaving the last broach in place. Any defects remaining can be filled with allograft or autologous bone placed in intimate contact with the sleeve.

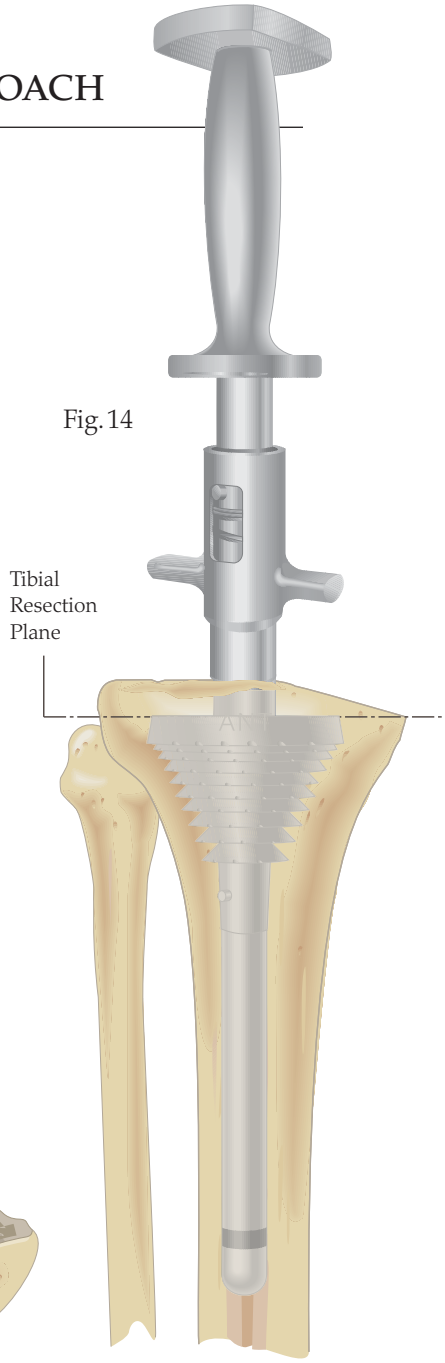


Fig. 14

When utilizing a sleeve, resect the tibia off the top of the broach. [Fig. 15]

Resect the proximal tibia utilizing the top of the broach as a guide. The top of the broach has a 2° slope built in. The proximal cut should be parallel to the top of the broach.

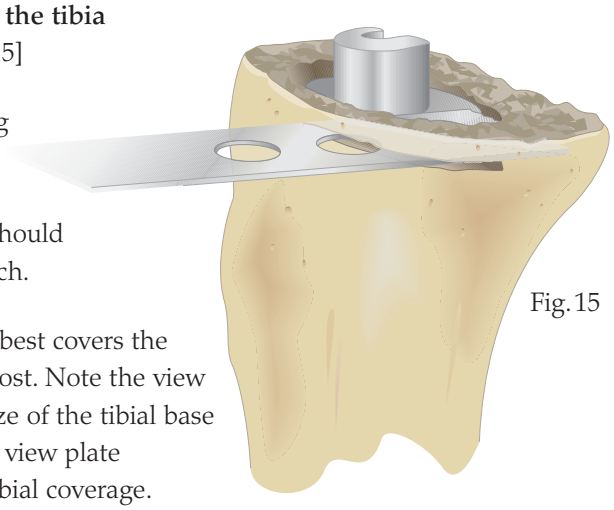


Fig. 15

Slide the tibial view plate which best covers the proximal tibial over the broach post. Note the view plate size, as it will dictate the size of the tibial base plate that will be used. The tibial view plate is transparent to help visualize tibial coverage. [Fig. 16] The template matches the implant to aid in orienting the tibial sleeve to the tibial base during assembly.

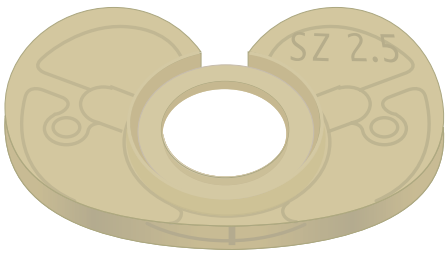


Fig. 16

Final Preparation of the Tibia

Place the knee in full extension and determine appropriate rotation of the tibial tray. [Fig. 17]

Mark the appropriate rotation with electrocautery on the anterior tibial cortex at the center and sides of the alignment handle.

Position the tibial tray trial with stem extension, and sleeve trial if applicable (sleeve trial allows 20 degrees of rotation) into the prepared tibial canal. Assess proximal tibial coverage and rotation of tibial component. Impact the appropriate keel punch (utilize the cemented keel punch if a cement mantle is desired or the press-fit keel punch if line-to-line contact is desired). [Fig. 18] The base plate should be positioned to provide the best coverage of the tibial condylar surface.

Disconnect the universal handle, leaving the keel punch in place for trial reduction. [Fig. 19]

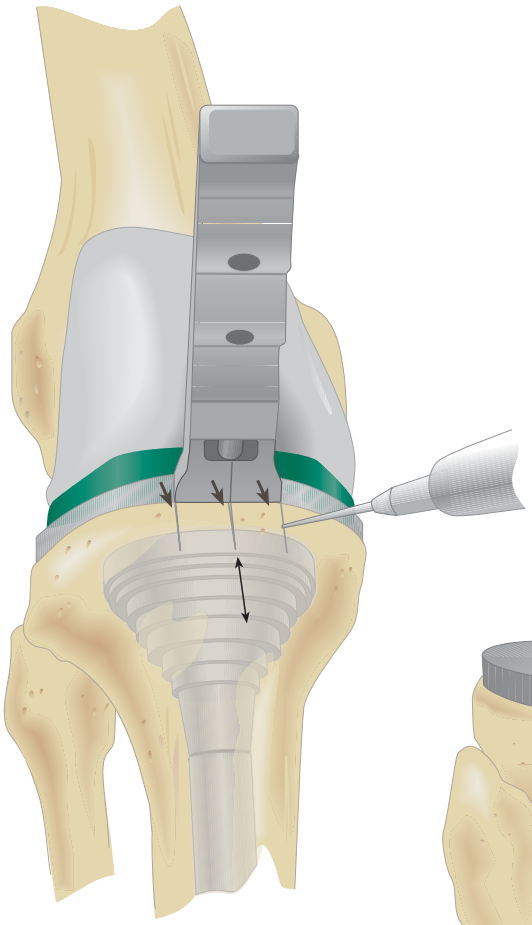


Fig. 17

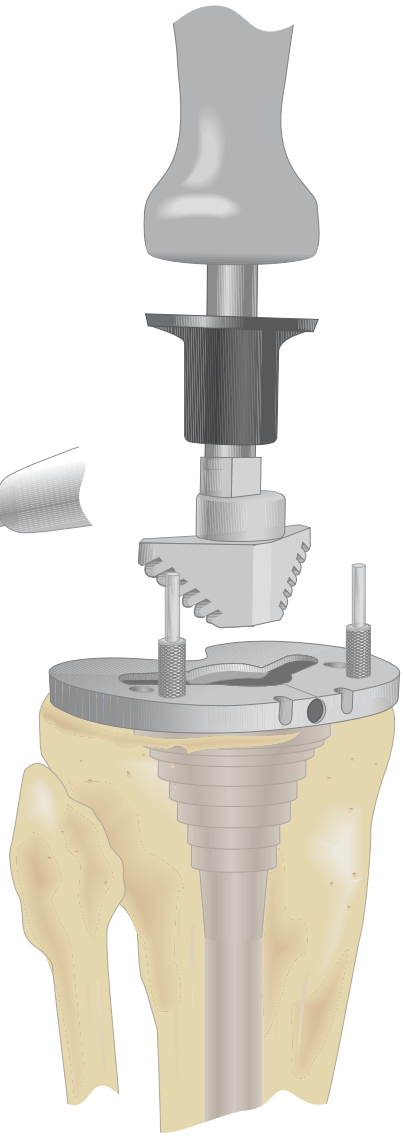


Fig. 18

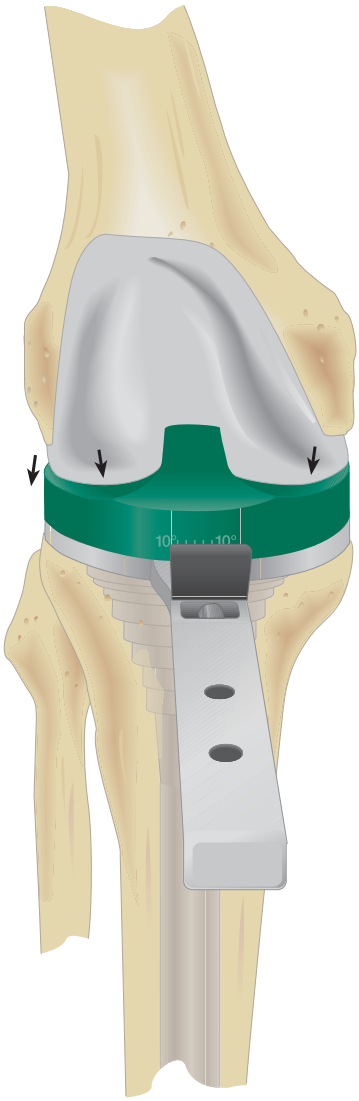


Fig. 19

TIBIAL SLEEVE ASSEMBLY

Note: It is imperative to assemble the sleeve prior to stem attachment.
Note: Sleeves and step wedges can only be used together if using a 29 mm sleeve.

Remove trial component in one piece (use as guide for assembly of implants).

Place the M.B.T. revision tray on a firm, stable, padded surface. Set the tibial sleeve in an orientation that matches the prepared canal. Matching the orientation of the tray/sleeve trial is helpful in determining appropriate rotation of the final tibial tray/sleeve implant. [Fig. 20] The sleeve can rotate 20 degrees internally or externally.

Using the sleeve impactor and a mallet, impact the sleeve onto the M.B.T. revision tray. Deliver several strikes to engage the two components. [Fig. 21]

Fig. 20

Fig. 21

WEDGE ASSEMBLY

Note: To aid wedge assembly, attach wedge prior to stem attachment.

Assemble the designated wedge to the tray and secure using the appropriate screw. Carefully tighten with the large T-handle torque driver until an audible click is discerned, ensuring a full and permanent interlock. [Fig. 22]

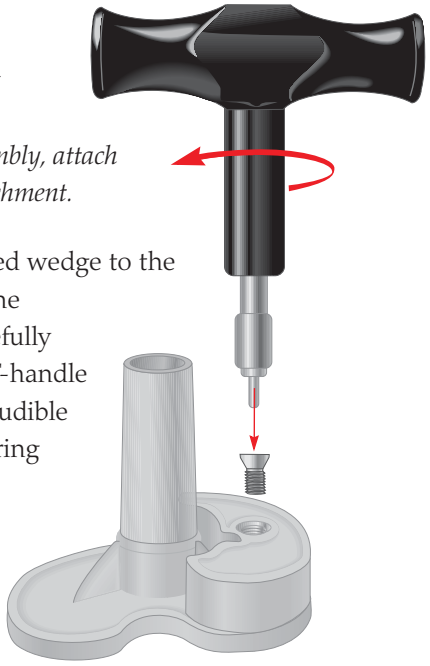


Fig. 22

STEM COMPONENT ASSEMBLY

Attach the tibial stem extension to the prosthetic tray using the ***two*** appropriate wrenches to ensure full engagement. [Fig. 23]

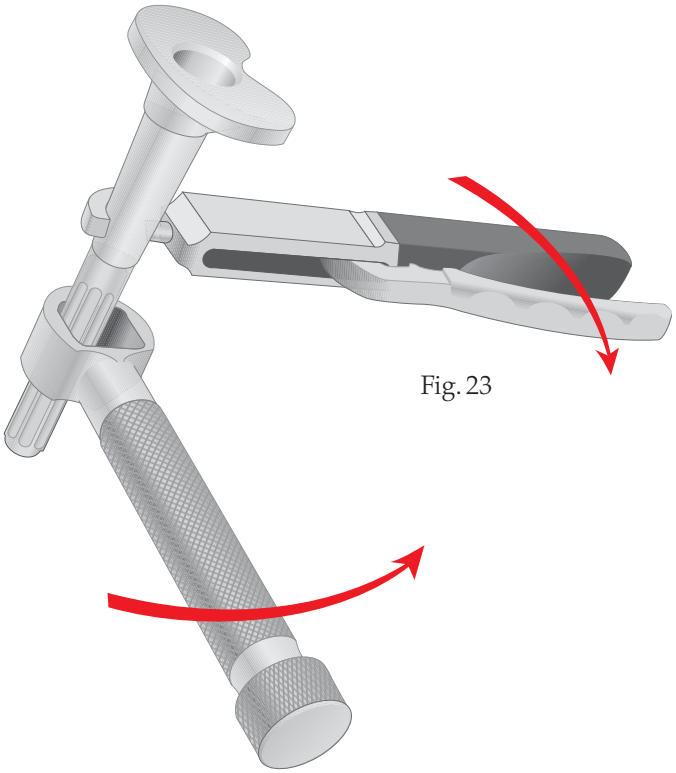


Fig. 23

Implanting the Tibial Component

Thoroughly cleanse the site with pulsatile lavage. Where the prepared tibial surface is eburnated, perforate with small drill holes to facilitate penetration of methyl methacrylate. [Fig. 24] Pack residual small cavitory bone defects with cancellous autograft, if available, or allograft. Apply methyl methacrylate cement to the proximal tibial surface or directly to the underside of the tibial tray component.

Note: Refer to Table 1 on page 15 to note appropriate set time for DePuy's bone cement.

When a fluted stem or a fluted stem with a metaphyseal filling sleeve is used, ensure the medullary canal remains free of cement. Clear all extruded cement with a curette. [Figs. 25 and 26]

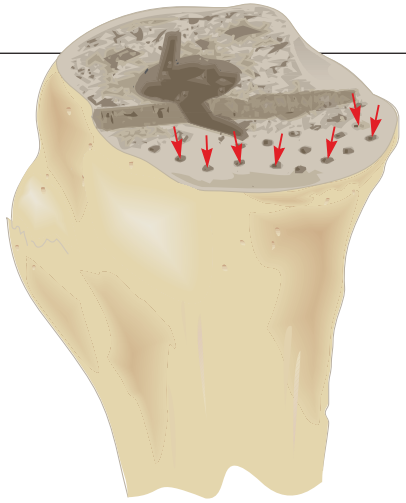


Fig. 24

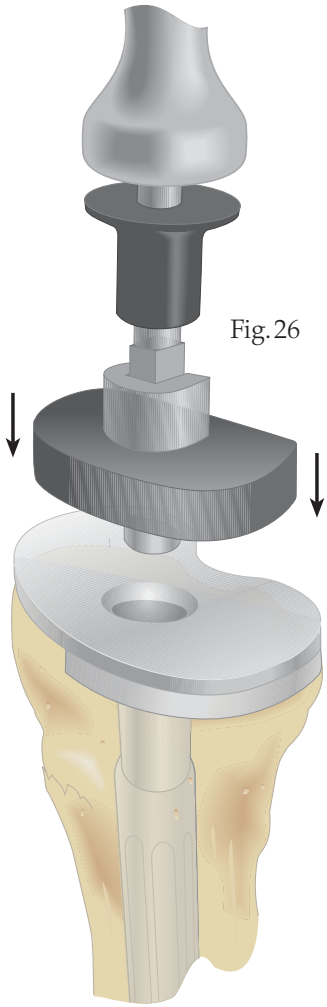


Fig. 26

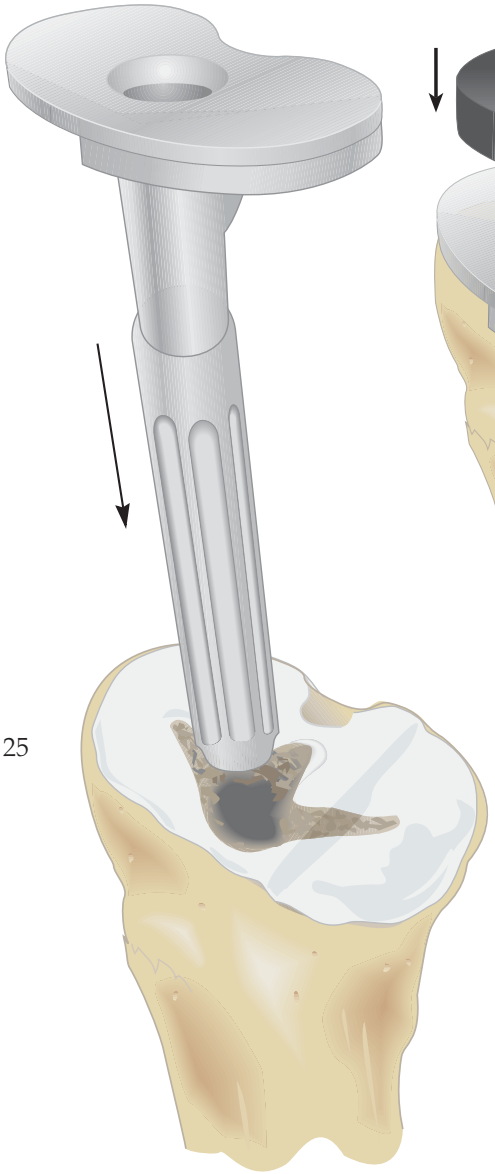
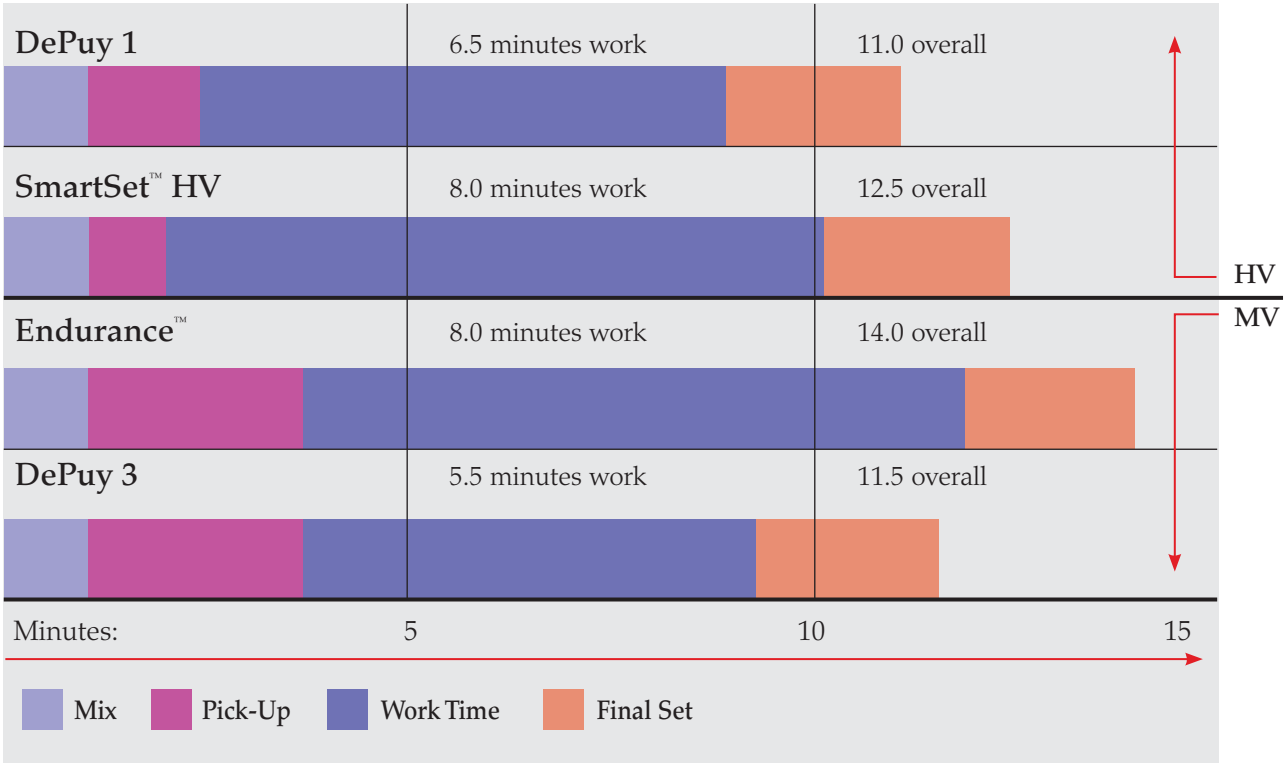


Fig. 25

Table 1: Comparison of Phases—Overall Set Time at 65˚F



Trial Reduction

When femoral rotation is known, place the revision stem extension into the cone of the M.B.T. revision implant. Seat the appropriate trial insert in the trial post/tray. [Fig. 27] The trial femoral component remains in place. Fully extend the knee to maintain pressure as the cement polymerizes. [Fig. 28] After cement polymerization, cement the femoral component.

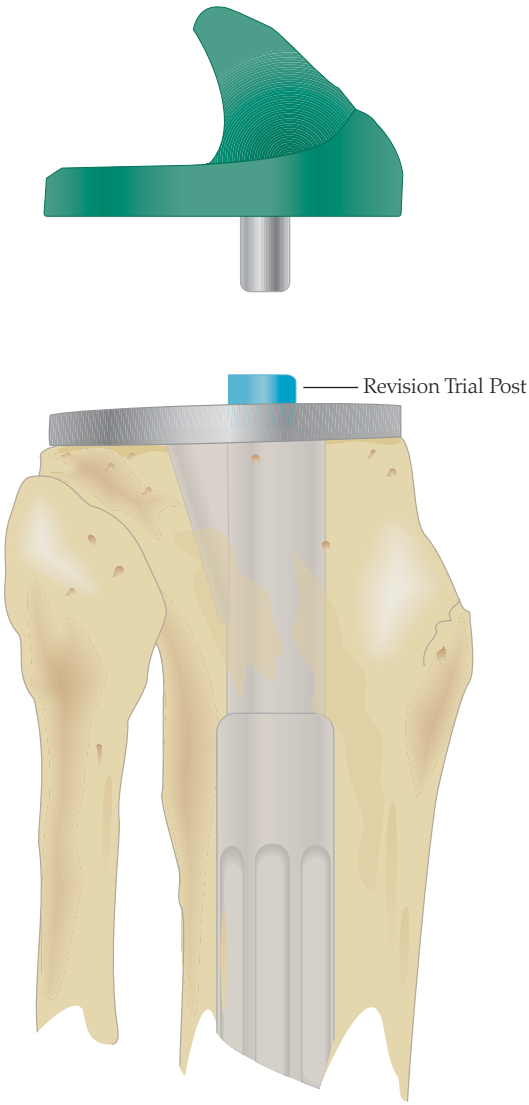


Fig. 27

Note: *With constrained femoral and tibial components in trial reduction, it may be appropriate to cement the tibial tray implant and the femoral implant using the insert trial. This will allow visibility of final rotation.*

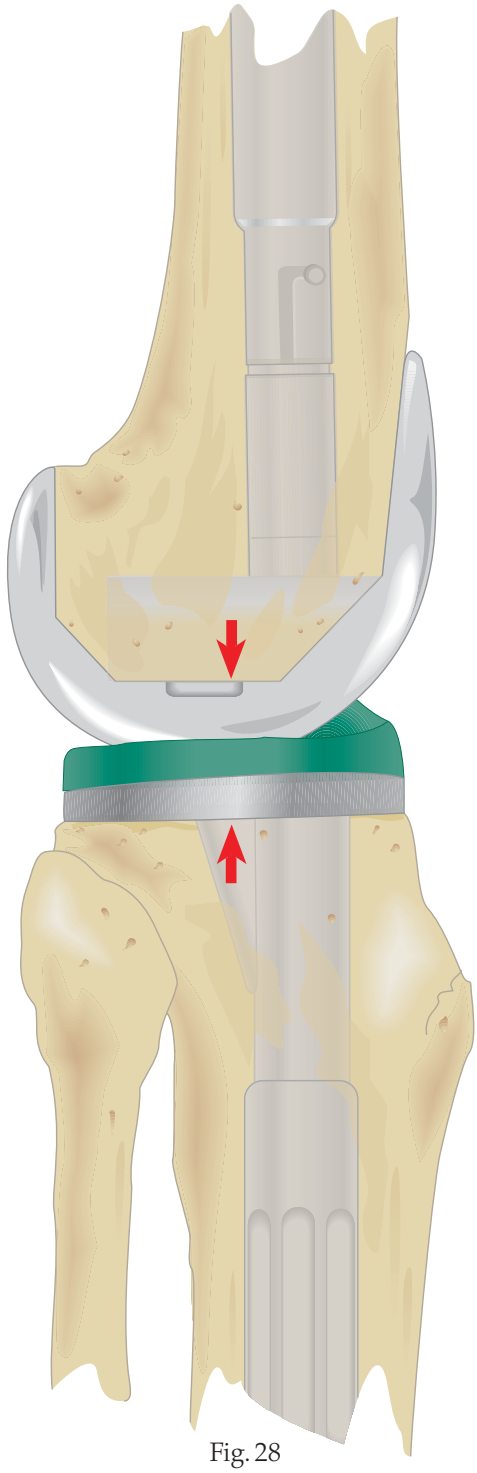


Fig. 28

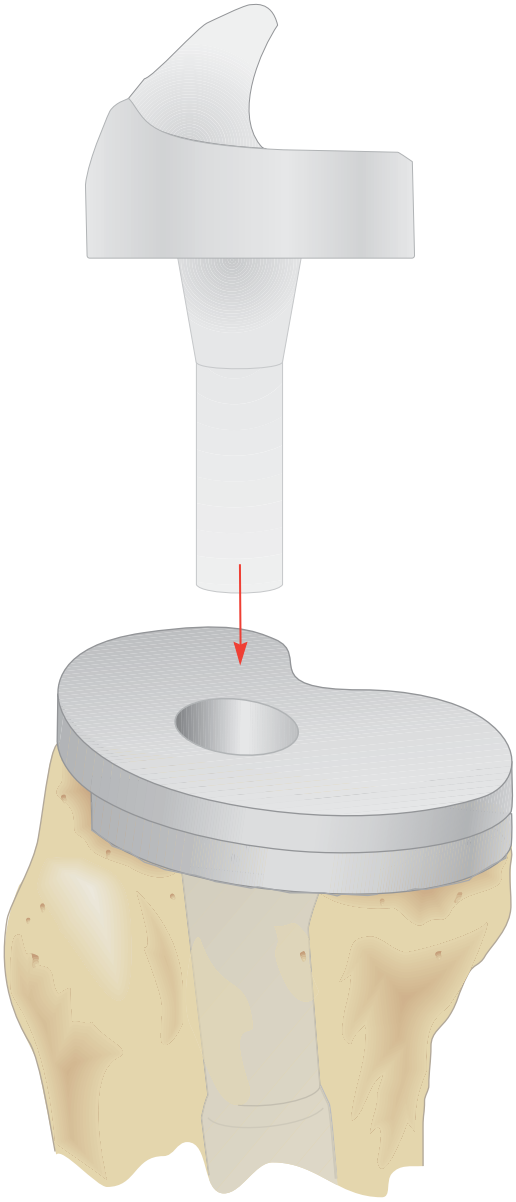


Fig. 29

The Tibial Insert

Perform reduction. Where indicated, substitute an appropriate replacement trial insert.

Subsequently remove the trial insert and trial post. Introduce the permanent insert into the implanted tibial tray. Due to the cone length, it is important to adequately deliver the tibia forward in order to place the insert in the tray. [Fig. 29]

Closure

At closure, put the knee through a range of motion from full extension to flexion to confirm patellar tracking and the integrity of capsular closure, with specific attention to extensor mechanism balance.

The Cemented Tibial Stem Extensions

Cemented Stem Reamer

Align the tibial tray and secure with two fixation pins inserted through the holes designated. [Fig. 30]

Seat the M.B.T. revision drill bushing onto the tibia trial. Place in the posterior holes.

Place the cemented drill bushing into the M.B.T. revision drill bushing. [Fig. 31]

Use the "cemented" reamer to ream to the predetermined selected depths for tray only **or** the tray with a 30 or 60 mm cemented stem.

Remove the reamer and "cemented" bushing, leaving the tray trial **and** M.B.T. revision drill bushing in place. [Fig. 32]

Note: Only a 13 mm diameter cemented stem should be used in conjunction with the M.B.T. revision tray to avoid a step off at the stem/tray junction.

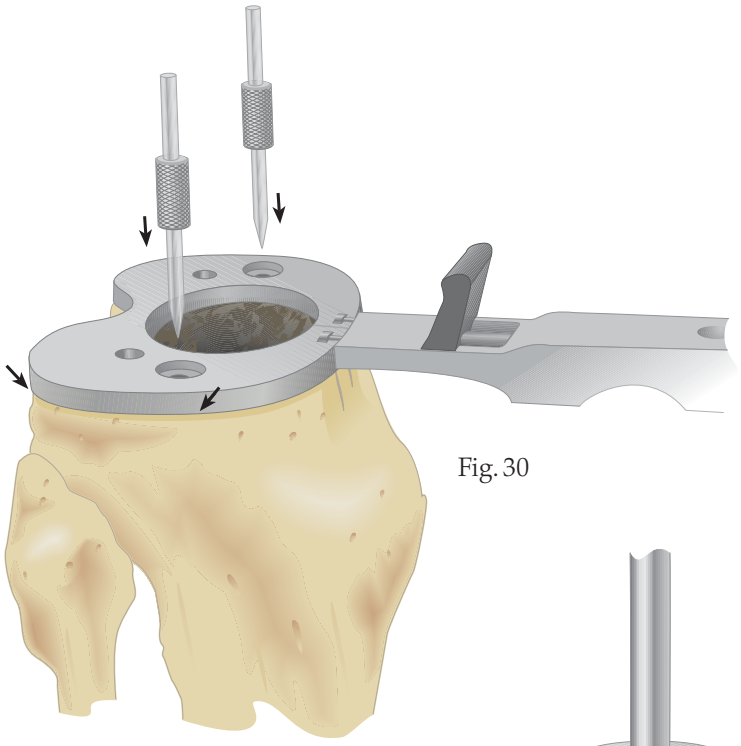


Fig. 30

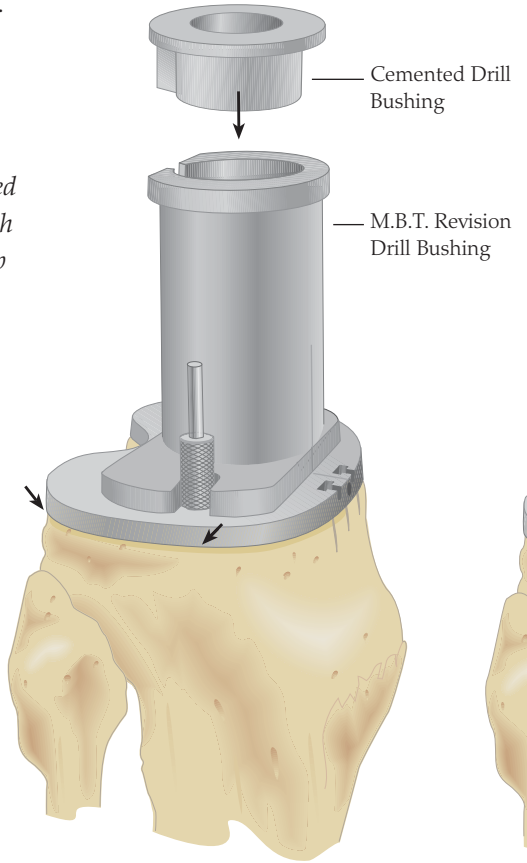


Fig. 31

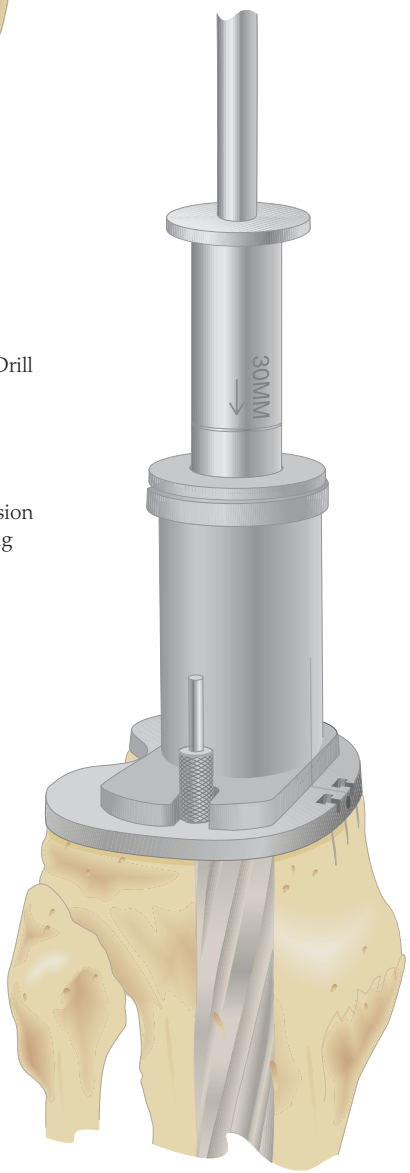


Fig. 32

Tapered Reamer

Assemble the revision reamer adapter onto the cemented tapered reamer.

Next, attach the modified Hudson adapter to the tapered reamer, if power reaming.

Attach the appropriately sized cemented stem trial (13 x 30 mm or 13 x 60 mm) to the tapered reamer if utilizing a cemented stem extension. [Fig. 33]

Ream until the revision reamer adapter is flush with the M.B.T. revision drill bushing. [Fig. 34]

Note: *To avoid stem trial disengagement, do not reverse ream.*

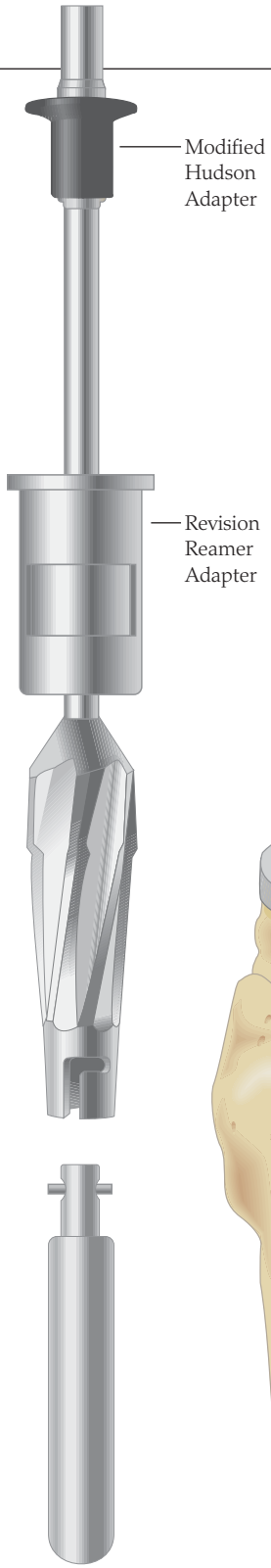


Fig. 33

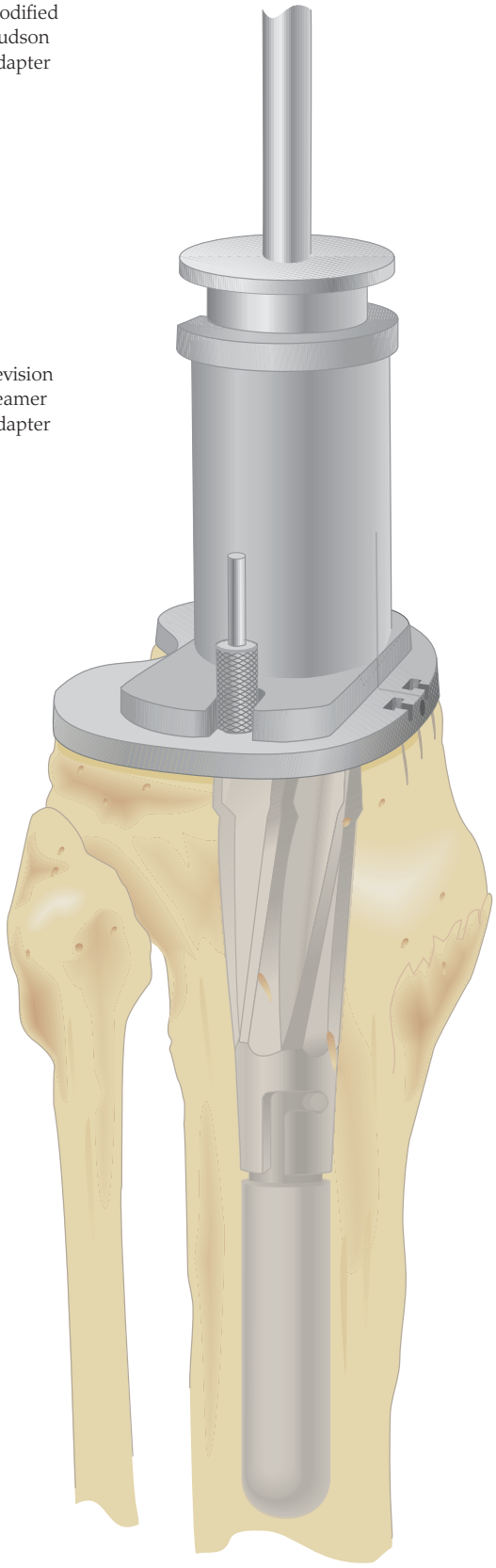


Fig. 34

Tibial Keel Preparation

Place the knee in full extension and determine appropriate rotation of the tibial tray.

Mark the appropriate rotation with electrocautery on the anterior tibial cortex at the center and sides of the alignment handle.

Assemble the appropriate stem trial to the M.B.T. revision tray trial and seat in the prepared bone bed.

Impact the cemented keel punch if a cement mantle is desired or the press-fit keel punch if line-to-line contact is desired. [Fig. 35]

Disconnect the universal handle leaving the keel punch in place for trial reduction (if appropriate).

It is recommended that a cement restrictor be placed at the appropriate level prior to cementing the component. Use a cement gun to fill the canal with methyl methacrylate.

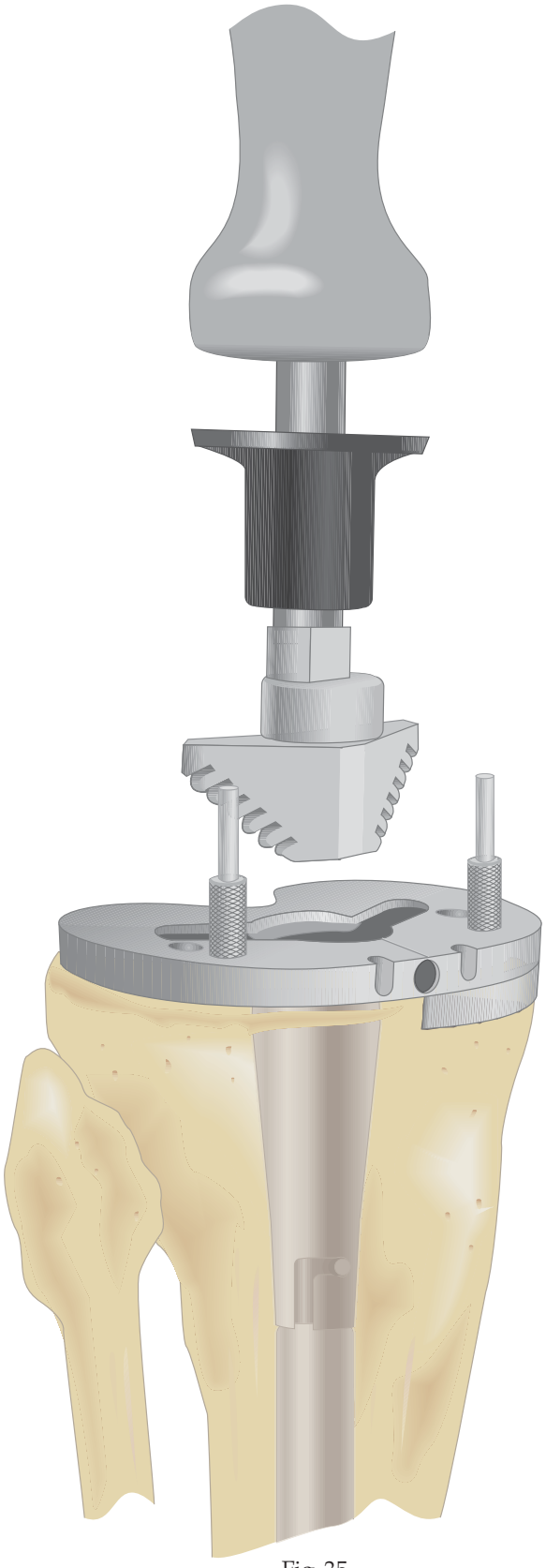


Fig. 35

Step Wedge Preparation

Step Wedge Augmentation

Resection for supplementary tibial augmentation may be based on the established position of the trial tray. Remove the femoral trial to provide greater access. Confirm rotational alignment of the tibial tray stem trial. Secure the tray with two fixation pins. Attach the tray trial wedge cutting attachment with the step wedge cutting guide to the trial tray. Slide the block forward to the anterior proximal tibia and secure in place with two Steinmann pins through the holes marked with □. [Fig. 36]

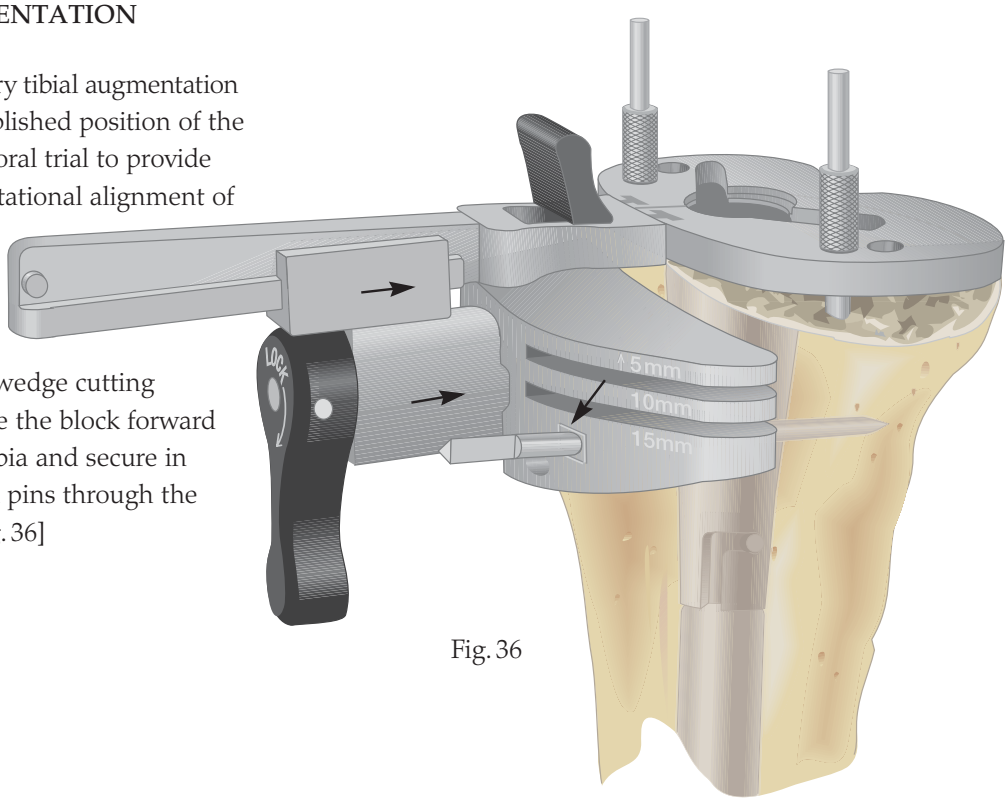


Fig. 36

Unlock the block and slide the assembly out of the block. Disconnect the handle from the trial tray.

Position the step wedge cutting block on the pins so the appropriate cutting surface (5, 10 or 15 mm step) is at the deficient condyle. [Fig. 37]

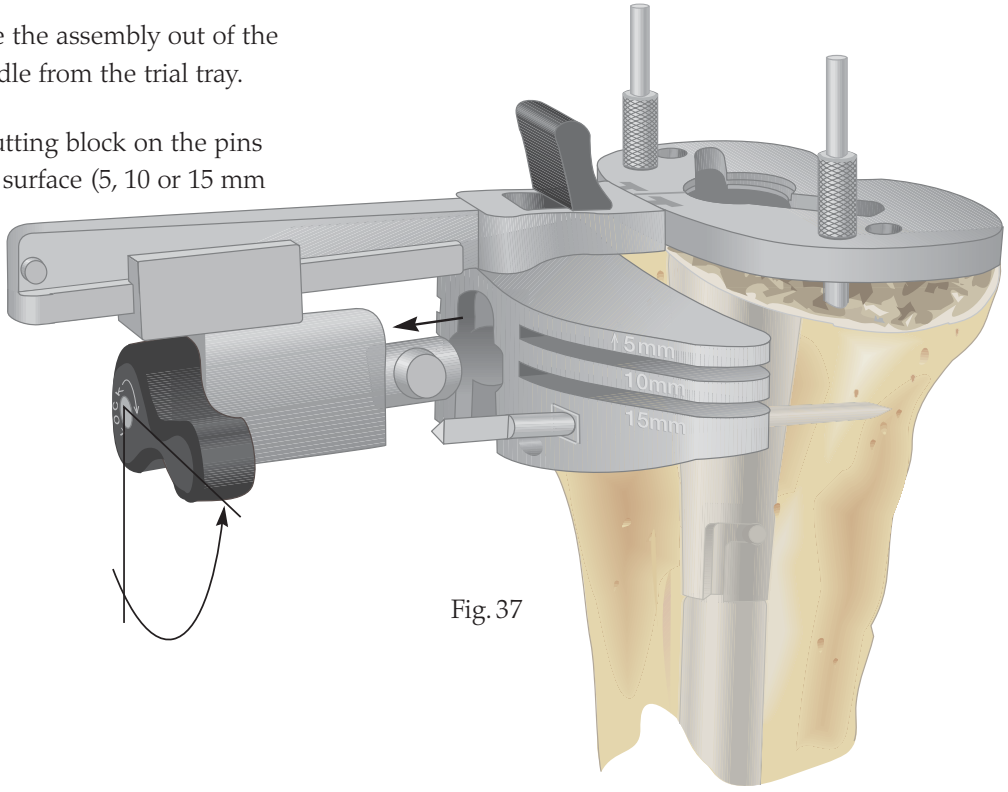


Fig. 37

Trim the tibia accordingly with an oscillating saw so the cut does not extend beyond the central riser. Remove the block and pins. [Fig. 38]

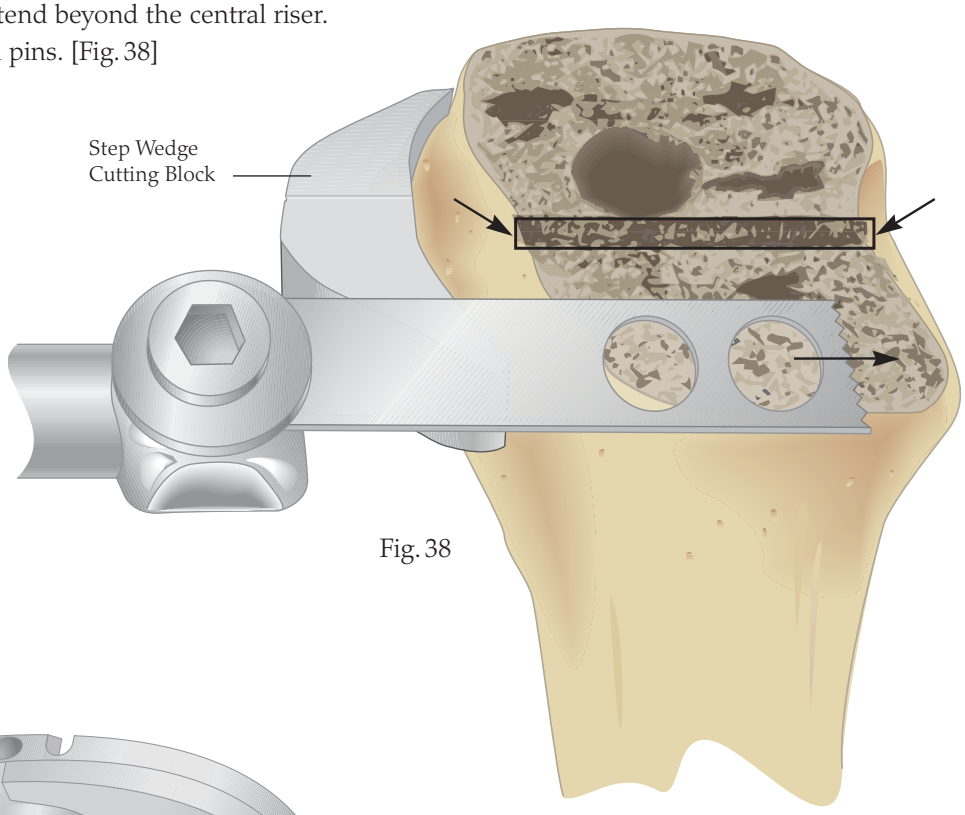


Fig. 38

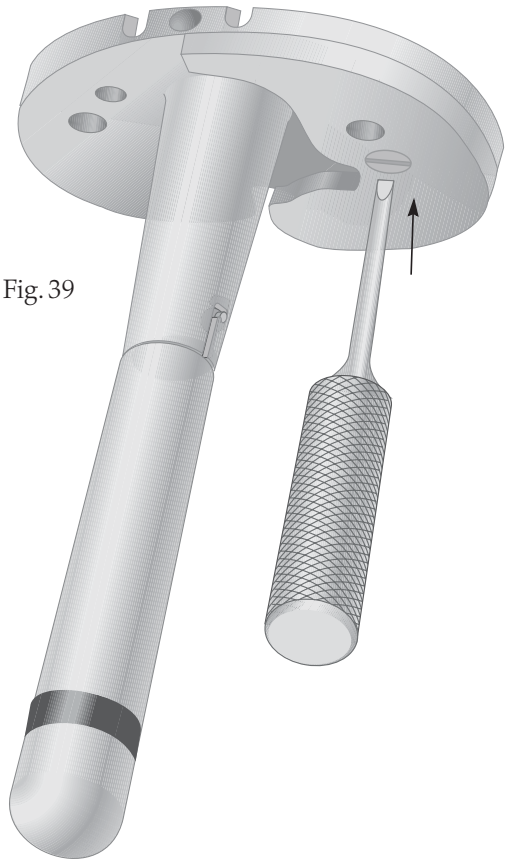


Fig. 39

Assemble the trial wedge to the appropriate tibial tray trial and introduce into the prepared site. Perform minimal correction with a bone file where indicated to ensure maximal contact. [Fig. 39]

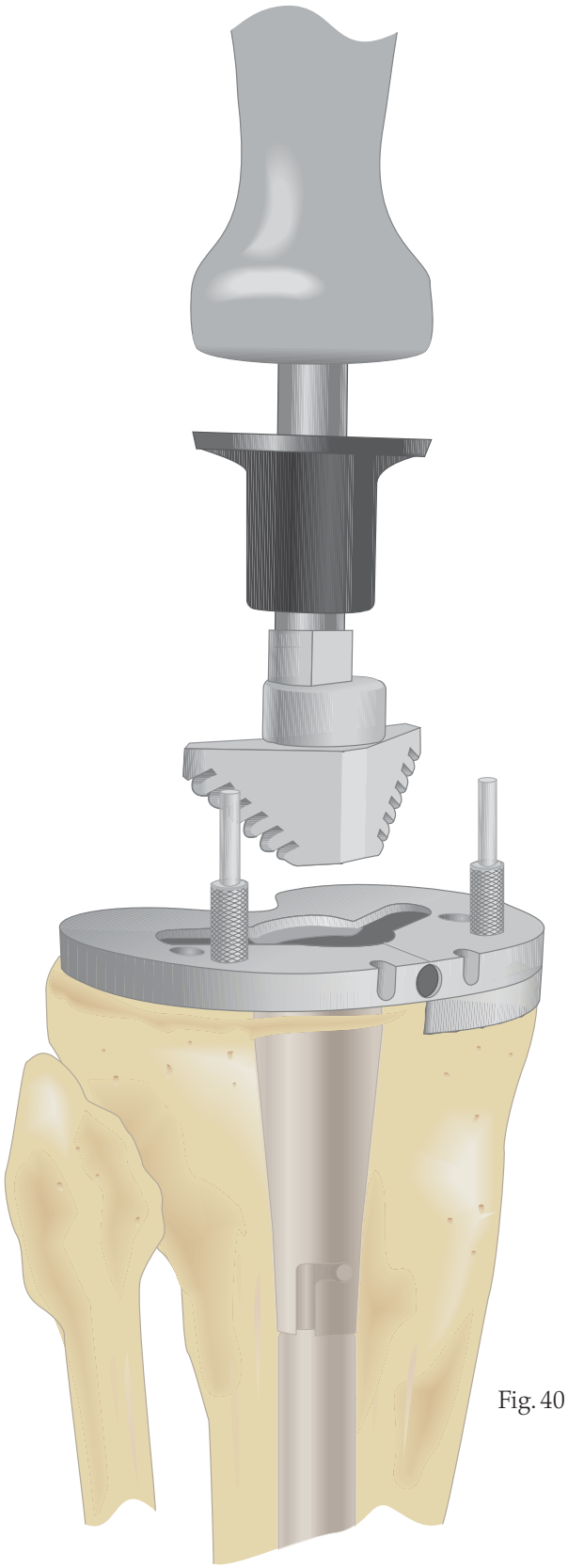


Fig. 40

Confirm positioning, alignment and security of the tray assembly. If there is old cement or sclerotic bone, relieve this first through the trial tray with a saw blade or burr prior to punching. Position the M.B.T. revision tibial keel punch at the tray and cancellous bone interface and impact into the keel configuration. Leave the punch in place and perform a final trial reduction if necessary. [Fig. 40]

Note: *Utilize the "cemented" keel punch when a cement mantle is desired.*

Alternative Step Wedge Preparation

This is a "free-hand" resection. Assemble the wedge trial and stem trial to the tibial tray trial. Position the device slightly proximal to the planned resection level. Make a conservative "free-hand" wedge resection and then check cuts with the trials. [Fig. 41]

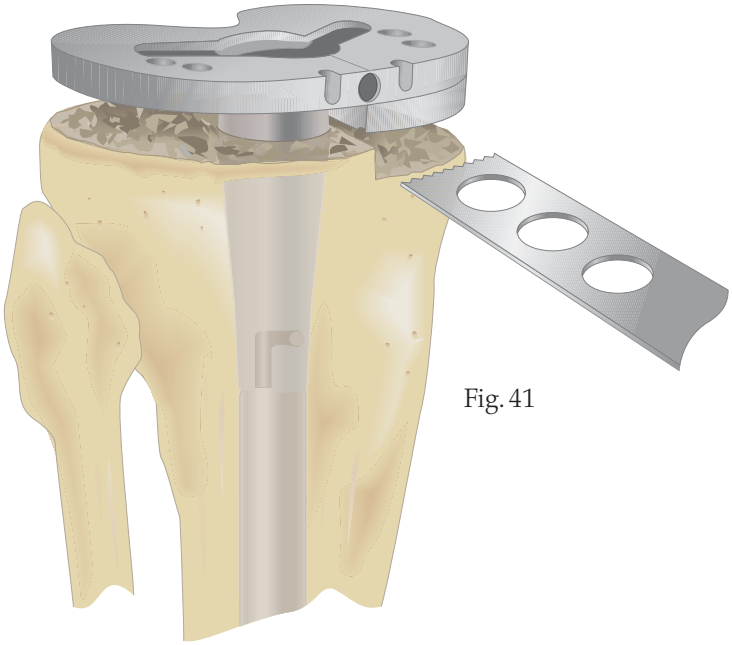


Fig. 41

Thick Tray Preparation

After impacting the cement or press-fit keel punch, remove the keel punch. Insert the M.B.T. thick tray trial adapter (15 or 25 mm) onto the tibial tray trial. [Figs. 42 and 43]

Note: *The tibial tray trial must be used with the thick tray adapters as the two pieces equal the appropriate sizing—15 or 25 mm.*

Perform the final trial reductions utilizing the same technique as the standard M.B.T. revision tray. Implant assembly and implantation is also the same as with the standard M.B.T. revision tray (see Assembling the Prosthesis, on page 13, for more information). If utilizing a wedge, refer to the step wedge preparation in Appendix II.

Note: *A tibial wedge can be used with all thick tray sizes, except for size 2. Sleeves may be used with all thick trays.*

Fig. 42

Fig. 43

M.B.T. Revision Tray

Cat. No.	Size (mm)	A/P	M/L	Stem Length	Tray Thickness
1294-35-110	1	39.0	59.2	61.8	4.8
1294-35-115	1.5	40.7	61.8	61.8	4.8
1294-35-120	2	42.6	64.6	61.8	4.8
1294-35-125	2.5	44.2	67.1	61.8	4.8
1294-35-130	3	45.8	69.6	61.8	4.8
1294-35-140	4	49.3	74.9	61.8	4.8
1294-35-150	5	53.1	80.6	61.8	4.8
1294-35-160	6	57.2	86.8	61.8	4.8
1294-35-215	2+15	42.6	64.6	61.8	15
1294-35-225	2+25	42.6	64.6	61.8	25
1294-35-315	3+15	45.8	69.6	61.8	15
1294-35-325	3+25	45.8	69.6	61.8	25
1294-35-415	4+15	49.3	74.9	61.8	15
1294-35-425	4+25	49.3	74.9	61.8	25

M.B.T. Revision Sleeve

Cat. No.	Size (mm)	A/P	M/L	Height
1294-54-000	29	26	29	40
1294-54-140 (Cemented)	29	26	29	40
1294-54-100	37	27	37	40
1294-54-110	45	27	45	40
1294-54-120	53	31	53	40
1294-54-130	61	34	61	40

M.B.T. Revision Augments

Cat. No.	Size (mm)	Cat. No.	Size (mm)
1294-56-110	1- 5	1294-56-130	3-5
1294-56-111	1-10	1294-56-131	3-10
1294-56-112	1-15	1294-56-132	3-15
1294-56-115	1.5-5	1294-56-135	4-5
1294-56-116	1.5-10	1294-56-136	4-10
1294-56-117	1.5-15	1294-56-137	4-15
1294-56-120	2-5	1294-56-140	5-5
1294-56-121	2-10	1294-56-141	5-10
1294-56-122	2-15	1294-56-142	5-15
1294-56-125	2.5-5	1294-56-145	6-5
1294-56-126	2.5-10	1294-56-146	6-10
1294-56-127	2.5-15	1294-56-147	6-15

Express Care Kits - Implants

Kit No.	Kit Name
386A	M.B.T. Revision Sleeves
385A	M.B.T. Revision Trays Size 2-5
387A	M.B.T. Revision Stepped Wedges Size 2-5, 5, 10, 15 mm

Express Care Kits - Instruments

Kit No.	Kit Name
MBR100B	M.B.T. Revision Straight Reamers
MBR101B	M.B.T. Revision Prep Instruments
MBR102B	M.B.T./LCS Complete Femoral Revision Stem Trials
MBR103B	M.B.T. Revision Wedge Trials and Instruments

			Orthogenesis LPS XX-Small Femur	Orthogenesis LPS X-Small Femur and S-ROM X-Small Femur	S-ROM Small Femur	S-ROM Medium Femur
	Tray No.	**M/L**	**56.6**	**66.7**	**66.7**	**71.2**
M.B.T. Revision Tray Size 1	1294-35-110	59.2				
M.B.T. Revision Tray Size 1.5	1294-35-115	61.8				
M.B.T. Revision Tray Size 2	1294-35-120	64.6				
M.B.T. Revision Tray Size 2.5	1294-35-125	67.1				
M.B.T. Revision Tray Size 3	1294-35-130	69.6				
M.B.T. Revision Tray Size 4	1294-35-140	74.9				
M.B.T. Revision Tray Size 5	1294-35-150	80.6				
M.B.T. Revision Tray Size 6	1294-35-160	86.8				

Orthogenesis LPS inserts must match S-ROM or Orthogenesis LPS femurs size-to-size. For example, xx small femur = xx small polyethylene; small femur = small polyethylene etc.

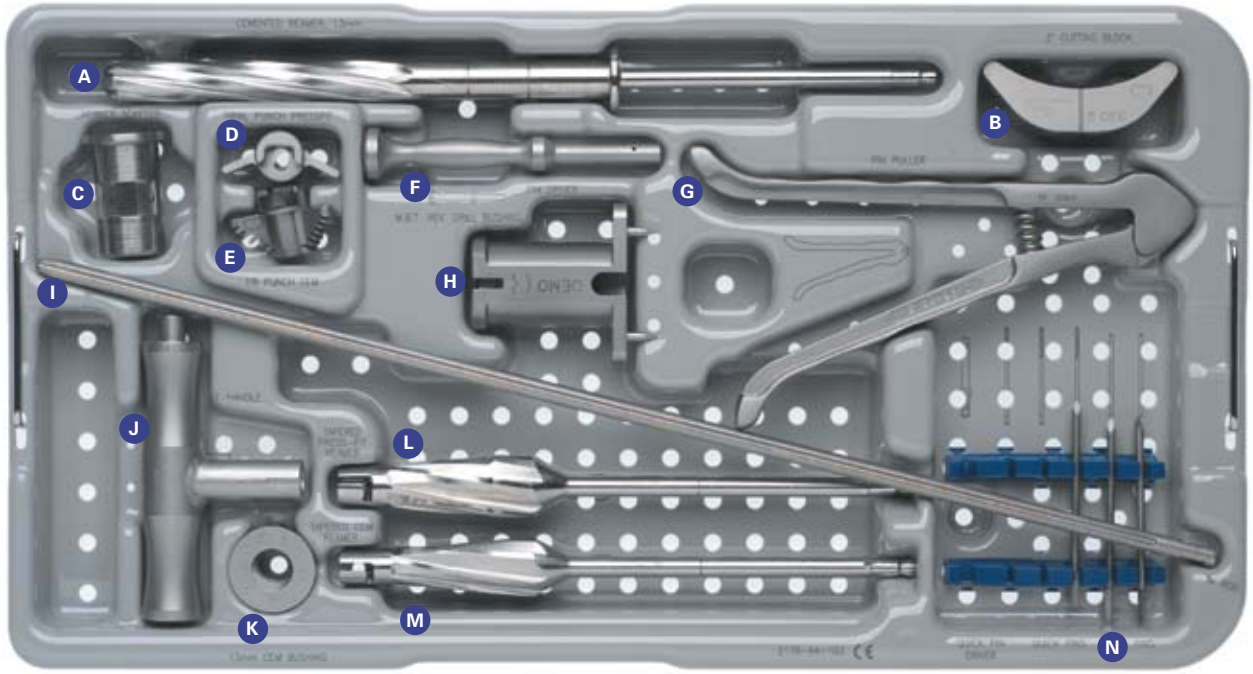
M.B.T. Revision Trays LCS Complete Revision Tibial Inserts (RPS and VVC)

Sizes	**Small**	**Small+**	**Medium**	**Standard**	**Standard+**	**Large**	**Large+**
Size 1 (1294-35-110)							
Size 1.5 (1294-35-115)							
Size 2 (1294-35-120)							
Size 2.5 (1294-35-125)							
Size 3 (1294-35-130)							
Size 4 (1294-35-140)							
Size 5 (1294-35-150)							
Size 6 (1294-35-160)							

M.B.T. Revision Prep Sterilization

Top Insert

Cat. No. 2178-64-100



	Description	Size	Cat. No.
A	Cemented Stem Reamer	13 mm	2178-63-185
B	2-Degree Cutting Block		2178-40-086
C	Reamer Adapter		2178-63-128
D	Tibial Punch Press-fit		2178-63-118
E	Tibial Punch Cemented		2178-63-120
F	Pin Holder	.125 in.	2490-94-000
G	SP2 Pin Puller		96-6515
H	Drill Bushing		2178-63-100
I	SP2 I.M. Rod	400 mm	96-6120
J	I.M. Rod Handle		99-2011
K	Cemented Bushing	13 mm	2178-63-196
L	Tapered Press-fit Reamer		2178-63-104
M	Tapered Cemented Reamer		2178-63-106
N	Steinmann Pins		86-9117

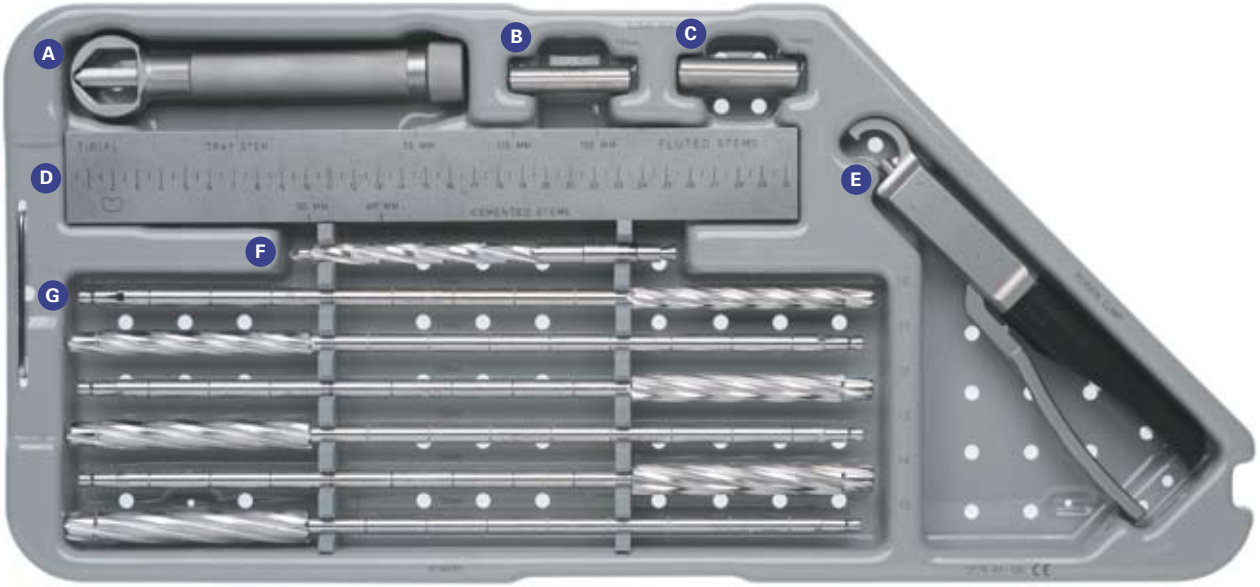
Base and Bottom Insert Cat. No. 2178-64-100

	Description	Size	Cat. No.
A	2-Degree Broach	29 mm	2178-63-109
B	2-Degree Broach	37 mm	2178-63-111
C	2-Degree Broach	45 mm	2178-63-113
D	2-Degree Broach	53 mm	2178-63-115
E	2-Degree Broach	61 mm	2178-63-117
F	Sleeve Trial	29 mm	2294-54-000
G	Sleeve Trial	37 mm	2294-54-100
H	Sleeve Trial	45 mm	2294-54-110
I	Sleeve Trial	53 mm	2294-54-120
J	Sleeve Trial	61 mm	2294-54-130
K	M.B.T. Revision Tibial Broach Handle		96-6521
L	I.M. Tibial Alignment Device		96-6315
M	Tibial Stylus		2178-40-045
N	Sleeve Impactor		2178-63-124
O	Femoral Sleeve/Stem Impactor		2178-63-126
P	Universal Handle		96-6520
Q	Tray Impactor		96-5383
R	View Plates	**Size**	**Cat. No.**
		1	2178-65-110
		1.5	2178-65-115
		2	2178-65-120
		2.5	2178-65-125
		3	2178-65-130
		4	2178-65-140
		5	2178-65-150
		6	2178-65-160

Revision Reamers Sterilization Tray

Top Insert

Cat. No. 2178-64-105



	Description	Size	Cat. No.
A	Press-fit Rod Wrench		86-5189
B	Sleeve Guide	12 mm	2178-63-187
C	Sleeve Guide	14 mm	2178-63-188
D	Reamer Depth Scale		2178-63-102
E	Revision Femoral/Tibial/Sleeve Clamp		2178-63-134
F	I.M. Initiator Drill Tibial	9 mm	2189-03-000
G	M.B.T. Revision Reamers	**Size**	**Cat. No.**
		10 mm	2178-63-170
		11 mm	2178-63-171
		12 mm	2178-63-172
		13 mm	2178-63-173
		14 mm	2178-63-174
		15 mm	2178-63-175

Revision Reamers Sterilization Tray

Base and Bottom Insert

Cat. No. 2178-64-105

	Description	Size	Cat. No.
A	M.B.T. Revision Reamers	16 mm	2178-63-176
		17 mm	2178-63-177
		18 mm	2178-63-178
		19 mm	2178-63-179
		20 mm	2178-63-180
		21 mm	2178-63-181
		22 mm	2178-63-182
		23 mm	2178-63-183
		24 mm	2178-63-184
B	Reamer T-handle		2178-63-137
C	Hudson Adapter		2178-63-136
D	I.M. Rod Sleeve Guide	16 mm	2178-63-189
E	I.M. Rod Sleeve Guide	18 mm	2178-63-190
F	I.M. Rod Sleeve Guide	20 mm	2178-63-191
G	I.M. Rod Sleeve Guide	22 mm	2178-63-192
H	I.M. Rod Sleeve Guide	24 mm	2178-63-193
I	I.M. Rod Sleeve Guide	26 mm	2178-63-194

Revision Stem Trials & Instruments Sterilization Tray

Top Insert

Cat. No. 2178-64-110

	Description	Size	Cat. No.
A	Revision Femoral/Tibial/Sleeve Clamp		2178-63-134
B	Tibial Cemented Stem Trial	13 x 60 2-3	86-6502
C	Tibial Cemented Stem Trial	13 x 30 1.5-3	86-6501
D	Stem Trial Extractor		86-5226
E	Fluted Tibial Rod Trials	**Size**	**Cat. No.**
		10 x 75	86-6874
		12 x 75	86-6875
		14 x 75	86-6876
		16 x 75	86-6877
		18 x 75	86-6878
		20 x 75	86-6878
		22 x 75	86-6880
		24 x 75	86-6881

	Description	Size	Cat. No.
F	Fluted Tibial Rod Trials	10 x 115	86-6882
		12 x 115	86-6883
		14 x 115	86-6884
		16 x 115	86-6885
		18 x 115	86-6886
		20 x 115	86-6887
		22 x 115	86-6888
		24 x 115	86-6889
G	Fluted Tibial Rod Trials	10 x 150	86-6890
		12 x 150	86-6891
		14 x 150	86-6892
		16 x 150	86-6893
		18 x 150	86-6894
		20 x 150	86-6895
		22 x 150	86-6896
		24 x 150	86-6897

Base and Bottom Insert

Cat. No. 2178-64-110

	Description	Size	Cat. No.
A	Press-fit Rod Wrench		86-5189
B	Tibial Cemented Stem Trial	13 x 60 2-3	86-6502
C	Tibial Cemented Stem Trial	13 x 30 1.5-3	86-6501
D	Fluted Tibial Rod Trials	**Size**	**Cat. No.**
		10 x 75	86-6874
		12 x 75	86-6875
		14 x 75	86-6876
		16 x 75	86-6877
		18 x 75	86-6878
		20 x 75	86-6878
		22 x 75	86-6880
		24 x 75	86-6881

	Description	Size	Cat. No.
E	Fluted Tibial Rod Trials	10 x 115	86-6882
		12 x 115	86-6883
		14 x 115	86-6884
		16 x 115	86-6885
		18 x 115	86-6886
		20 x 115	86-6887
		22 x 115	86-6888
		24 x 115	86-6889
F	Fluted Tibial Rod Trials	10 x 150	86-6890
		12 x 150	86-6891
		14 x 150	86-6892
		16 x 150	86-6893
		18 x 150	86-6894
		20 x 150	86-6895
		22 x 150	86-6896
		24 x 150	86-6897

M.B.T. Revision Tray Trials & Wedge Instruments Sterilization Tray

Top Insert

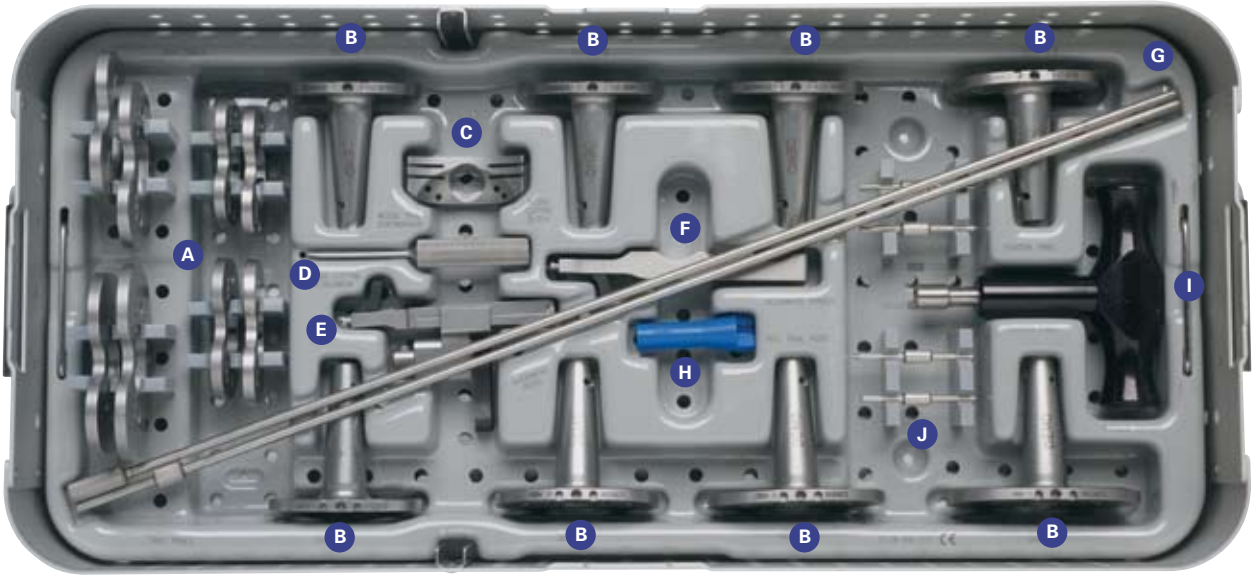
Cat. No. 2178-64-115

Description	Size	Cat. No.
A M.B.T. Step Wedge Trials	5 mm	
	1	2294-56-110
	1.5	2294-56-115
	2	2294-56-120
	2.5	2294-56-125
	3	2294-56-130
	4	2294-56-135
	5	2294-56-140
	6/7	2294-56-145
B M.B.T. Step Wedge Trials	10 mm	
	1	2294-56-111
	1.5	2294-56-116
	2	2294-56-121
	2.5	2294-56-126
	3	2294-56-131
	4	2294-56-136
	5	2294-56-141
	6/7	2294-56-146

Description	Size	Cat. No.
C M.B.T. Step Wedge Trials	15 mm	
	1	2294-56-112
	1.5	2294-56-117
	2	2294-56-122
	2.5	2294-56-127
	3	2294-56-132
	4	2294-56-137
	5	2294-56-142
	6/7	2294-56-147

M.B.T. Revision Tray Trials & Wedge Instruments Sterilization Tray

Base and Bottom Insert Cat. No. 2178-64-115



Description	Size	Cat. No.
A M.B.T. Tibial Trials		
	1	2294-36-110
	1.5	2294-36-115
	2	2294-36-120
	2.5	2294-36-125
	3	2294-36-130
	4	2294-36-140
	5	2294-36-150
	6	2294-36-160
B Tray Trials with Stem	**Size**	**Cat. No.**
	1	2294-35-111
	1.5	2294-35-115
	2	2294-35-120
	2.5	2294-35-125
	3	2294-35-130
	4	2294-35-140
	5	2294-35-150
	6	2294-35-160

Description	Size	Cat. No.
C Cut Block		2178-63-122
D Screw Driver		86-0277
E Wedge Cut Attachment		2178-63-130
F Alignment Handle		96-6330
G Alignment Rods		99-1016
H Trial Post		2178-63-132
I Torque Driver		86-0284
J Fixation Pins		2178-30-123

LCS® Complete™ – P.F.C.® Sigma™ RP Mobile Bearing Total Knee System

Important

This Essential Product Information sheet does not include all of the information necessary for selection and use of a device. Please see full labeling for all necessary information.

Indications

Cemented Use:

The LCS® Complete™ – P.F.C.® Sigma™ RP Mobile Bearing Total Knee System is indicated for cemented use in cases of osteoarthritis and rheumatoid arthritis. The RPF insert and femoral component are indicated where a higher than normal degree of postoperative flexion is required. The rotating platform prosthesis and modular revision components are indicated for revision of failed knee prostheses.

Uncemented Use:

The porous coated Keeled and Non Keeled M.B.T.™ (Mobile Bearing Tibial) Tray configurations of the LCS Total 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. The P.F.C. Sigma RP Curved bearings when used with the P.F.C. Sigma Cruciate Retaining Femoral Component can be used in posterior cruciate ligament retaining procedures.

Contraindications

The use of the LCS Complete – P.F.C. Sigma RP Mobile Bearing Total Knee System is contraindicated in:

- the presence of osteomyelitis, pyrogenic infection or other overt infection of the knee joint;
- patients with any active infection at sites such as the genitourinary tract, pulmonary system, skin or any other site. Should a patient have any infection prior to implantation, the foci of the infection must be treated prior to, during and after implantation;
- patients with loss of musculature or neuromuscular compromise leading to loss of function in the involved limb or in whom the requirements for its use would affect recommended rehabilitation procedures;
- patients with severe osteoporosis or other metabolic bone diseases of the knee.
- patients with any of the following conditions:
    - lesions of the supporting bone structures (e.g. aneurysmal or simple bone cysts, giant cell tumor or any malignant tumor);
    - systemic and metabolic disorders leading to progressive deterioration of solid bone support;
    - the presence of severe instability secondary to advanced loss of osteochondral structure or the absence of collateral ligament integrity, fixed deformities greater than 60° of flexion, 45° of genu varus or valgus,
    - known drug or alcohol addiction;
    - skeletally immature individuals and the presence of allergic reaction to implant metals or polyethylene are also contraindications for the noncemented, porous coated, M.B.T. and LCS Complete – P.F.C. Sigma RP Mobile Bearing device configurations, and for the cemented use of all device configurations of the LCS Complete – P.F.C. Sigma RP Mobile Bearing Total Knee System.

Contraindications for use without Cement

Noncemented use of the Porous Coated Keeled or Non-Keeled M.B.T. Tray device configurations is contraindicated in patients with sufficient loss in quantity or quality of bone stock (as determined on X-ray) such that successful noncemented fixation is unlikely. Additional contraindications may become apparent at the time of surgery. These include:

- vascular deficiency at the bone site;
- inadequate bone stock to assure both a firm press fit and close apposition of the cut bone surfaces to the prosthesis;
- the inability to make bone cuts so as to assure both correct component position and intimate apposition of bone and prosthetic surfaces;
- inadequate bone quality (e.g. severe osteoporosis) and lack of stability of the implanted components.

In the presence of any of the above conditions the components should be fixed with cement.

Warnings and Precautions

Components labeled for "Cemented Use Only" are to be implanted only with bone cement. The following conditions tend to adversely affect knee replacement implants: excessive patient weight, high levels of patient activity, likelihood of falls, poor bone stock, metabolic disorders, disabilities of other joints. The P.F.C. stem extensions can only be used with M.B.T. revision trays and LCS Complete Revision and Modular femoral components.

Adverse Events

The following are the most frequent adverse events after knee arthroplasty: change in position of the components, loosening, bending, cracking, fracture, deformation or wear of one or more of the components, infection, tissue reaction to implant materials or wear debris; pain, dislocation, subluxation, flexion contracture, decreased range of motion, lengthening or shortening of leg caused by improper positioning, looseness or wear of components; fractures of the femur or tibia.

For more information about DePuy products, visit our web site at **www.kneereplacement.com.**

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3.5M0506
0612-49-500 (Rev. 1)
Printed in USA.