

# TRK Total Revision Knee System

## Surgical Technique



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## “Movement is Life”

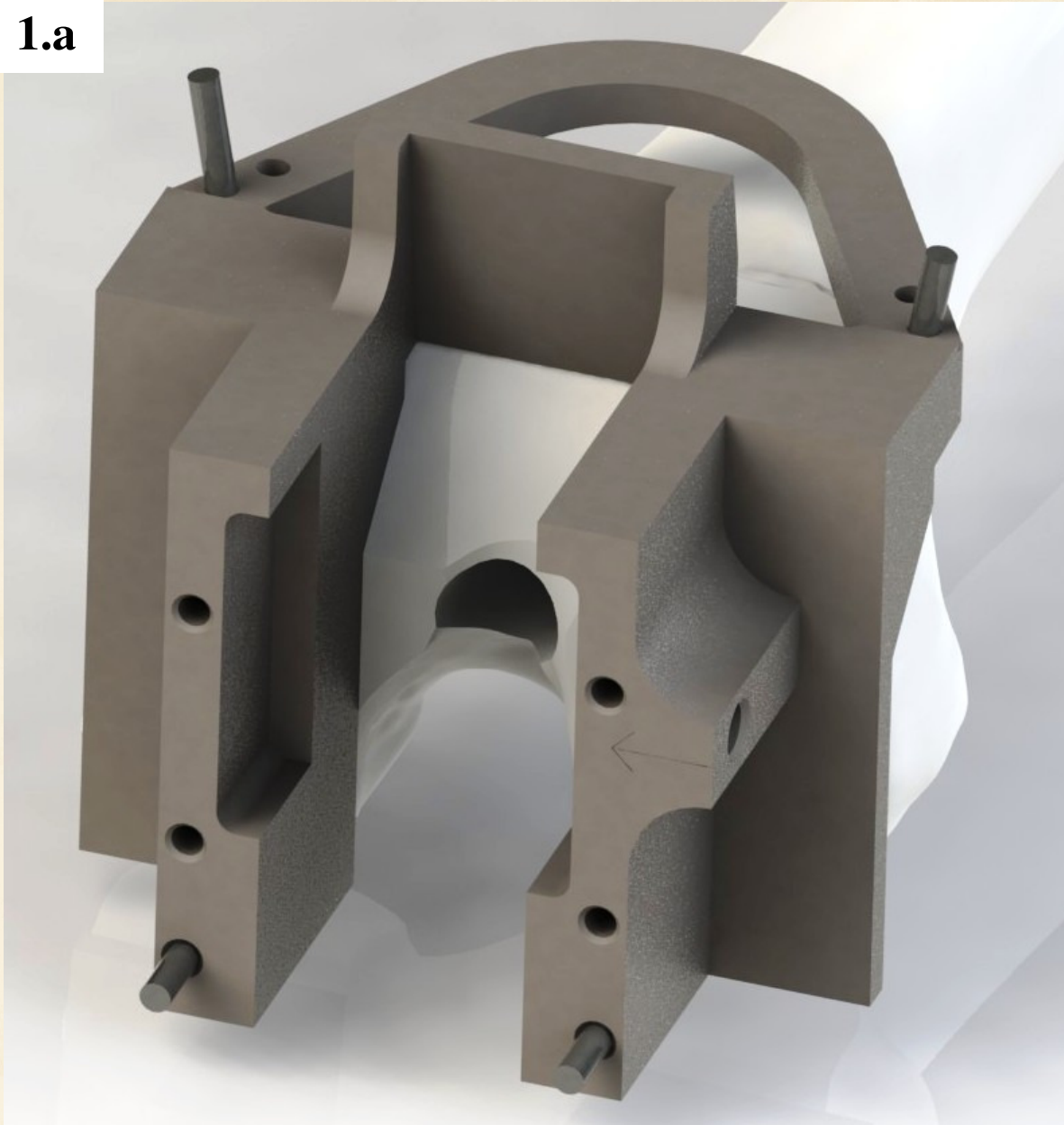
# TRK REVISION KNEE Surgical Technique

1. INTERCONDYLAR RESECTION.....	page 1.
2. FEMORAL STEM.....	page 5.
3. NON CEMENTED FEMORAL STEM .....	page 7.
4. TRIAL FEMORAL COMPONENTS.....	page 8.
5. TRIAL TIBIAL COMPONENTS.....	page 9.
6. DEFINITIVE COMPONENTS .....	page 10.
7. PROXIMAL TIBIA RESECTION – INTERMEDULLARY TECHNIQUE .....	page 12.
8. OFFSET USING THE MEASUREMENT AND MANAGEMENT FOR TIBIAL .....	page 16.
9. OFFSET USING THE MEASUREMENT AND MANAGEMENT FOR FEMORAL .....	page 20.
10. TAB.....	page 24.
TIBIAL ALIGNMENT .....	page 24.
CUTTING BLOCK SELECTION .....	page 26.
PROXIMAL TIBIA RESECTION .....	page 27.
TRIAL COMPONENTS .....	page 28.
TIBIAL STEM PREPARATION.....	page 30.
DEFINITIVE COMPONENTS.....	page 31.
11. FAB.....	page 33.
MEASURE CHECK .....	page 33.

## 1. INTERCONDYLAR RESECTION:

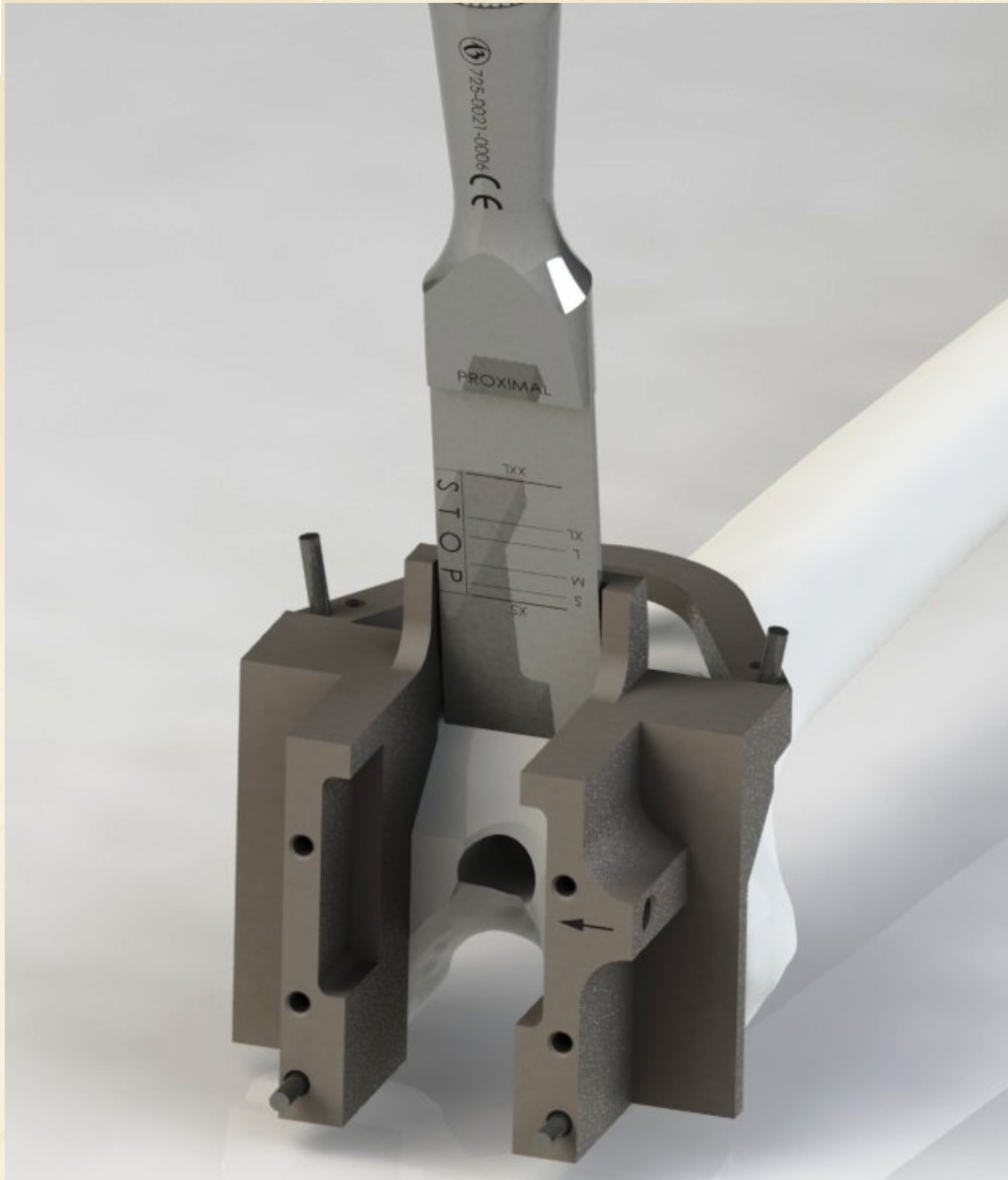
The BIOTECH TRK surgical technique is to be followed after the primary Surgical Technique. Select the appropriately size Femoral Box Cutting Guide, based on the reading from the A/P Sizing Guide. Center the Box Cutting Guide medial-laterally on the surface of the distal femur, with the guide outrigger resting flush on the cut surface of the anterior femoral bone. Secure the Guide with 3 to 4 fixation pins. (Fig. 1.a)

**1.a**



Using the oscillating saw blade, remove the medial and lateral portion of bone in the notch. Using an osteotome or a saw blade, remove the remaining bone from the femoral notch. NOTE: It may be necessary to remove additional bone around the intramedullar canal with a bone curette to provide clearance for the raised Stem Extension pad (Fig. 1.b).

**1.b**



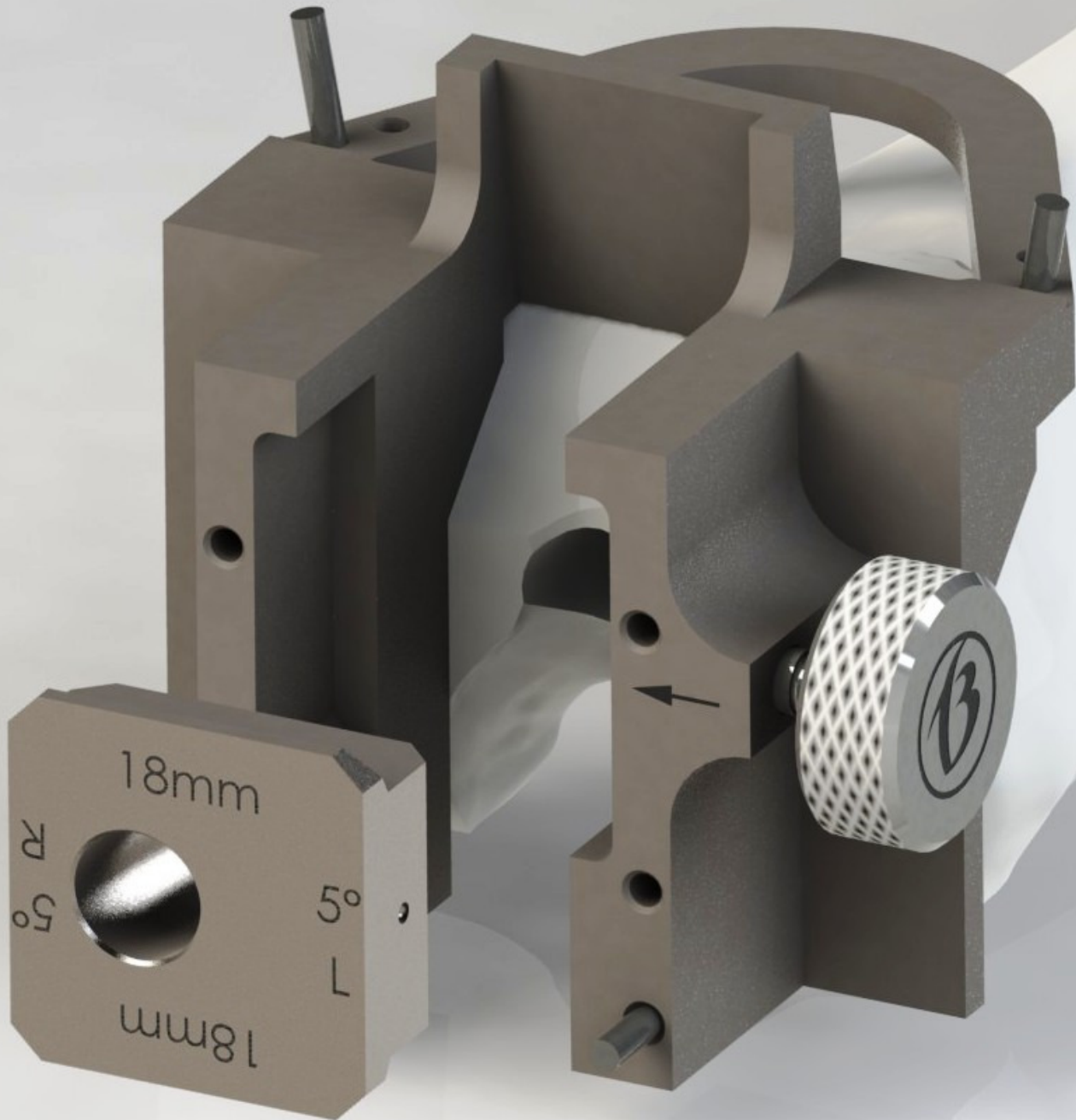
**Summary:**

- Select appropriate Box Cutting Guide.
- Center Box Cutting Guide medial-laterally on distal femur surface with the outrigger flush on the anterior femoral surface.
- Remove medial and lateral notch bone with oscillating saw blade.
- Remove remaining bone with an osteotome or a saw blade.

## 2. CEMENTED FEMORAL STEM:

Occasionally a Femoral Stem may be required to increase component stability. When this is necessary, with the knee in flexion, the Femoral Box Cutting Guide in place, and the femoral notch bone removed. Place the appropriate Reamer Guide into the center of the Femoral Box Cutting Guide for either a left or right femur, with “L” or “R” in alignment with the etched lateral groove on the Femoral Box Cutting Guide, so it can be read properly (Fig. 2.a)

2.a

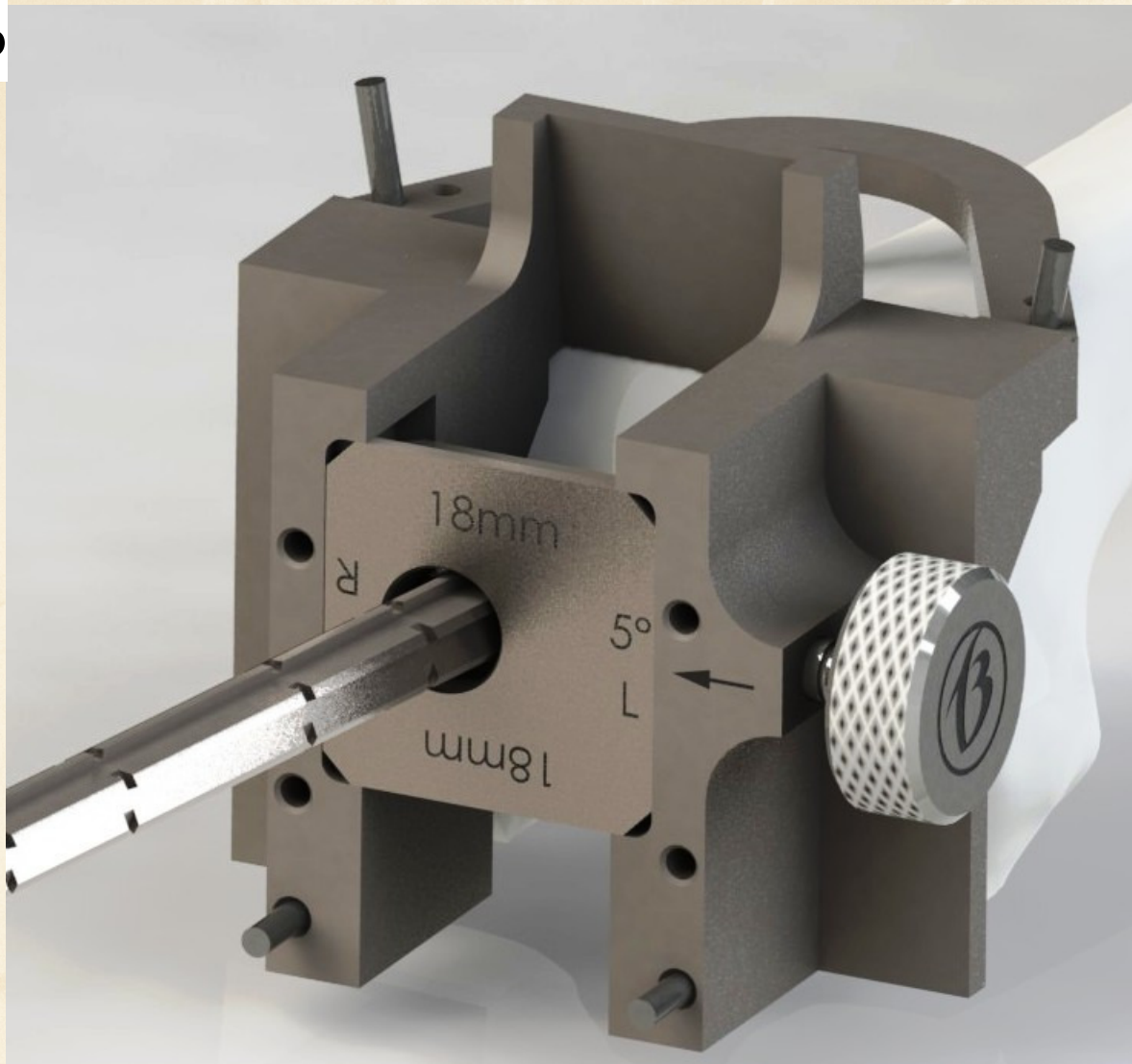


Attach the Stem Reamer to the Drill. Place the Reamer into the Reamer Guide and ream to the desired depth (Fig. 2.b) The Reamer is marked for a depth of 80mm, 110 mm and 140 mm. For a 80 mm Stem (reaming through the guide), the Reamer should be inserted into the femoral canal until the 80G depth edge mark is even with the Reamer Guide rim. Continue to ream upwards in diametrical size, using the appropriate sized Reamer and Reamer Guide until the desired canal diameter is obtained.

NOTE: The Reamers have two sets of markings for depth. When reaming through the Reamer Guide the 80G, 110G and 140G depths should be utilized. The second set of markings can be utilized when canal reaming is performed without the guides. In this situation, the 80mm, 110mm and 140mm markings should be aligned with the distal surface of the intercondylar cut.

- Select the 5°, 7° or 9° or at the reamer Guide.

## 2.b



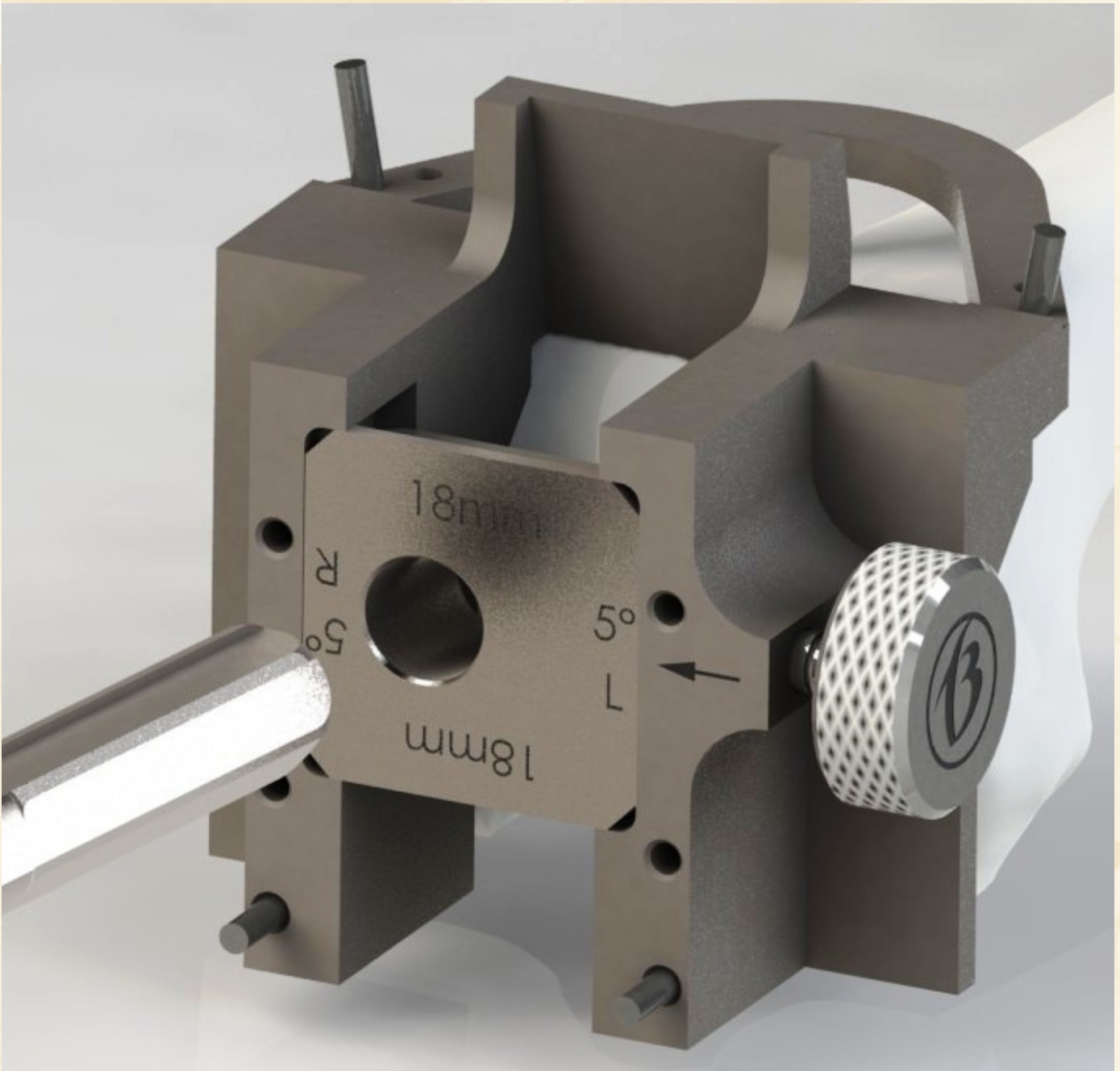
### Summary:

- Select the 5°, 7° or 9° or at the reamer Guide.
- Place the Reamer Guide into the centre of Femoral Box Cutting Guide for either the “left” or “right” femur.
- Ream to the desired depth.
- Ream upwards in diameter using appropriate Reamer and Guide.

### 3. NON CEMENTED FEMORAL STEM:

Continue reaming up in diameter, using appropriate sized Reamer Guides and Reamers sequentially until stable contact is achieved (Fig. 3.a) Remove Reamer, Reamer Guide and Femoral Box Cutting Guide.

3.a



#### Summary:

- Using matched Reamer Guides and Reamers, ream sequentially to the largest diameter, which provides stable contact.
- There are Stems in size 12mm, 14mm and 16mm diameter (optionally 10mm and 18 mm is also available.)

#### 4. TRIAL COMPONENTS:

Select the appropriate sized Revision Femoral Component Trial, select the Stem Extension Trial of the pre-reamed diameter and length, and select the adapter (7° or 5°-9°). Assemble in 4.a or 4.b figure. Tighten screws until all components are fully fixed.

**4.a**



**4.b**



4.a. Assembly sequence

1. Stem
2. Adapter
3. Stem screw

**4.c**



4.b. Assembly sequence

1. Stem
2. Offset with screw
3. Adapter
4. Stem screw



## 5. TIBIAL COMPONENTS:

The Tibial Tray Trial is placed onto the tibial surface and the Trial Inserts are then sequentially selected to determine the appropriate size thickness (Fig. 5.a). The Trial Patella Component is selected, corresponding to the diameter of the patella and placed into the patella central hole. When the Trial Components are in place, the range of motion and stability of the knee is checked.

5.a



### Summary:

- Select appropriate Revision Femoral Component Trial and the Stem Extension Trial.
- Select appropriate Tibial Tray Trial and Patella Trial.
- Place all Trial Components
- Perform range of motion to determine Trial Component stability

## 6. DEFINITIVE COMPONENTS

If a Femoral Stem Extension is to be used, attach the appropriate Stem Extension to the Femoral Component by lining up the desired 5°, 7° or 9° angle edge and key with the keyway and arrow on the pad of the Femoral Component. Verify that the stem is firmly seated on the component. This is of course used for offset (Fig.6.b) and without offset (Fig.6.a, 6.c )version.

**6.a**



**6.b**



**6.c**



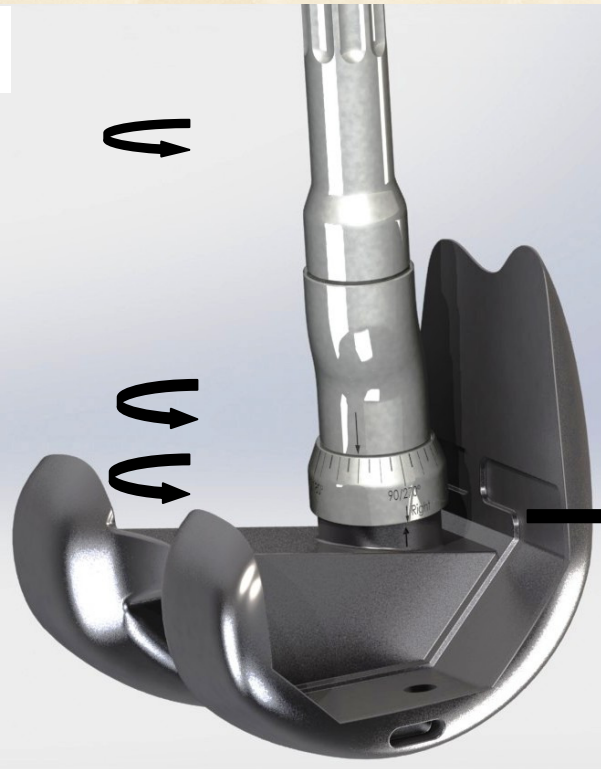
Insert the Femoral Locking Screw through the femoral box and fully seat in the Femoral Stem Extension using the hexagonal screwdriver (Fig. 6.d,e). Prepare the Femoral Component with cement. Assem-

## 6.d

Attach the Femoral Component to the Femoral Driver/Extractor and impact into place. Remove excess cement. Finish it with the Definitive Impactor. The tibial side implants placement is specified in detail in the standard Primary surgical technique.



## 6.e



### Summary:

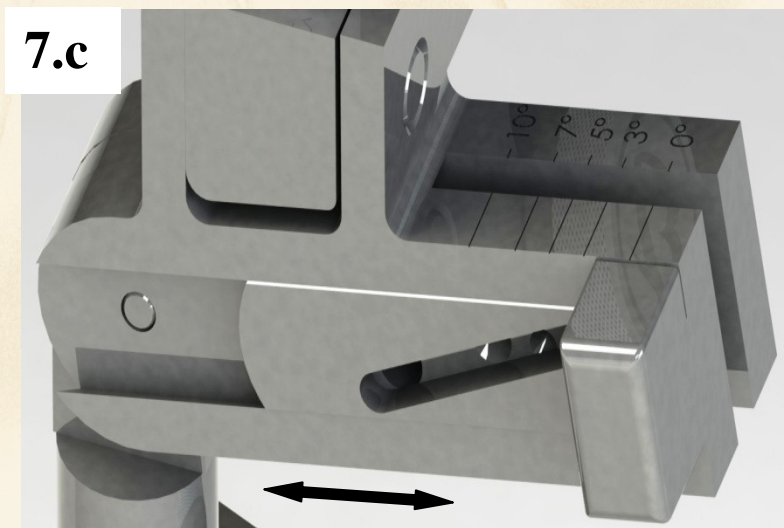
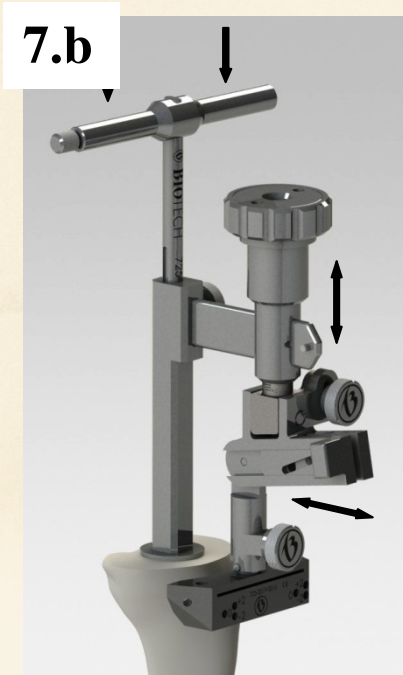
- Attach the femoral stems to the femoral component with adapter.
- Fully seat Stem.
- Insert Femoral Locking Screw through the Femoral Box and tighten thoroughly
- Assemble Femoral Component to Femoral Driver and cement into place

## 7. PROXIMAL RESECTION OF THE TIBIA \_ THE INTRAMEDULLARY TECHNIQUE

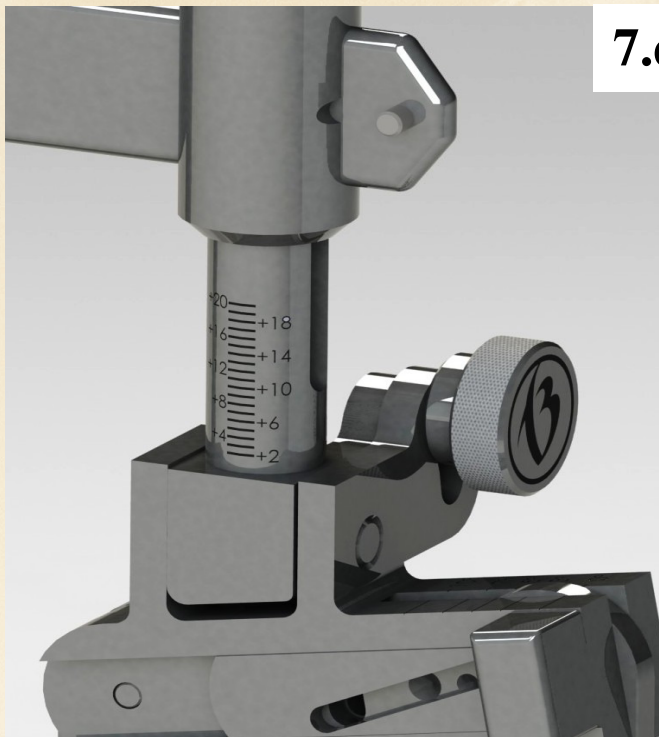
Prepare the knee by placing it at its maximal flexion position, and determine the tibial plateau midpoint. The point of entry to the intramedullary canal is then identified. It should fall posteriorly to the anterior cruciate ligament. Penetrate the intramedullary canal using a drill. Following the drilling, the resection block is placed in its position, and the Premier II tibial resection guide is fitted on it. Insert the T-handled fluted rod into the tibial resection guide, and push through into the intramedullary canal (Fig. 7.a.). This fluted rod will help drive out bone marrow. Proper positioning of the resection guide on to the tibial external cortex should be well checked.



Any adjustment needed to the angle of resection of posterior slope (Fig. 7.b.) can be easily achieved by moving the lever to the desired angle (Fig. 7.c). Available angle options are: 0°, 3°, 5°, 7°, and 10°



The minimum resection level is **2 mm**, when the resection block is at the highest position. By turning the knob counter clock-wise, the resection block can be lowered and thereby their **resection level can be increased by** until upto 20 mm. **1 mm steps** Read and set the resection level according to the **scale** marked on the resection guide. (Fig. 7.d)



**7.d**

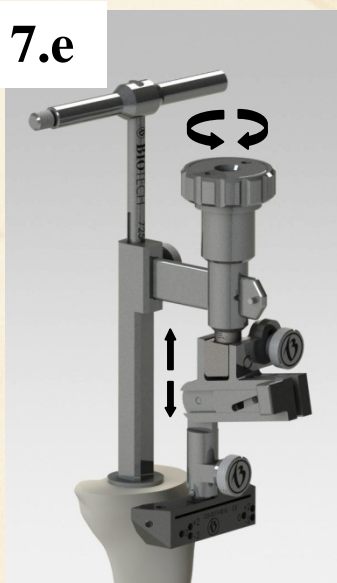


**For setting the resection level** turn the knob at the tip of the device (Fig 7.e).

**To lower** the resection guide: turn the knob counter clockwise.

**To raise** the resection guide: turn clockwise.

**7.e**



For medial and lateral alignment, connect the telescoping alignment rod to the tibial resection guide (Fig 7.f).

The alignment rod divides the talus into 2 parts at the joint line (Fig. 7.g).

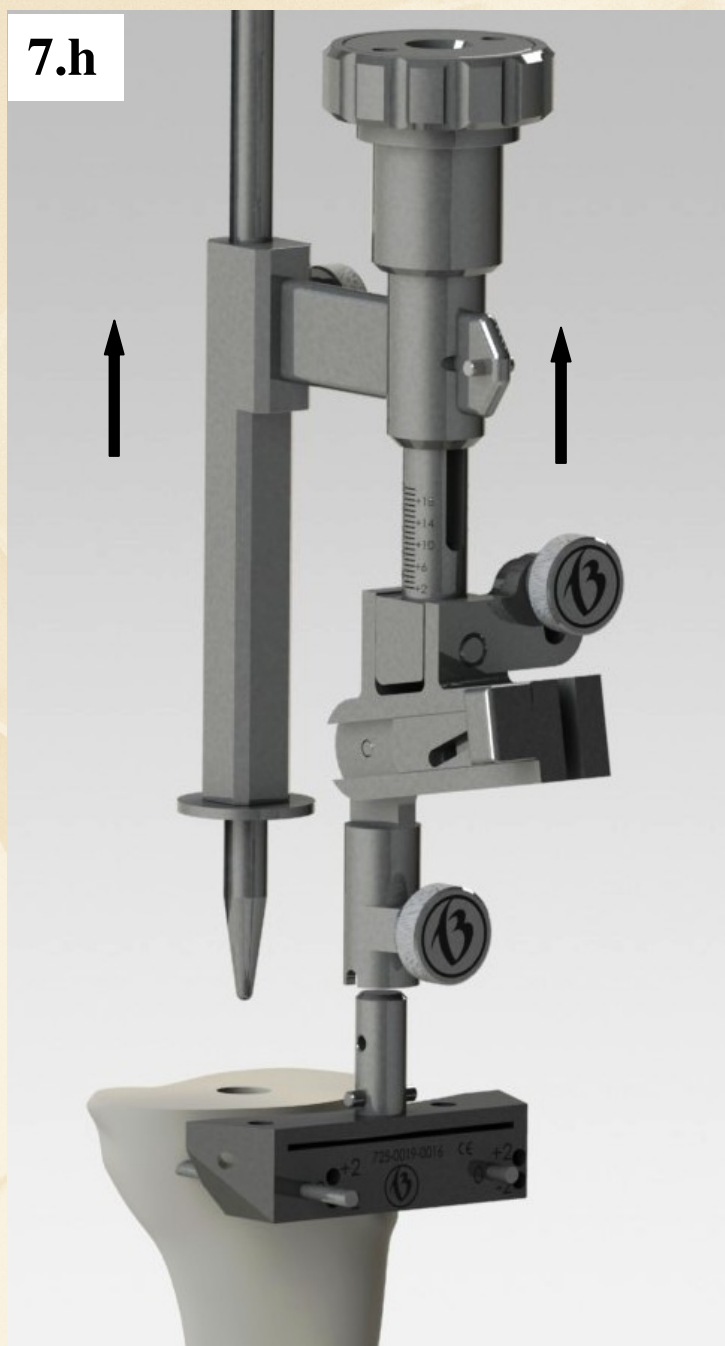


**For adjusting the medial-lateral alignment,** loosen out the knob, which is present over the posterior slope lever a little bit, and then re-adjust the rod position.

**When the alignment marks present on both the knob and the guide meet together, the guide will be at 0° of medial – lateral rotation.**

Use drills to fix the cutting block on to the tibia, or alternatively use fixation pins.

Remove the resection guide and rod, but not the resection block. (Fig.7.h).



Resect the plateau with an appropriate 1 mm saw blade. Extra rows of holes are available for an additional 2mm resection.

## 8. OFFSET USING THE MEASUREMENT AND MANAGEMENT FOR TIBIA

If the bone loss equal to or require the deformation, the revision of the tibial tray and stem offset supply must be included. In order to offset as far as possible we can build offset guide is needed. The offset measurement using the following:

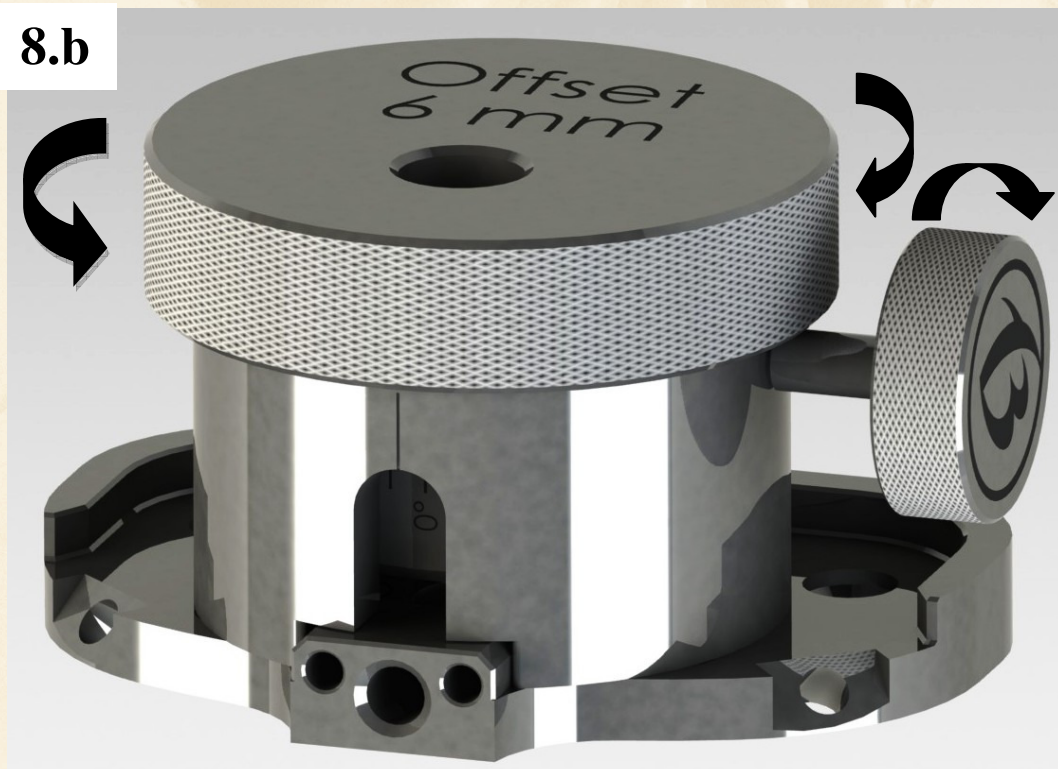
1. The trial tibial tray fixed with nail-head of the tibia bone. (Fig.8.a)

**8.a**



2. Put the offset guide on the tibial tray trial and the necessary degrees to rotate. Fixed with locking screw. The offset measurement into two types excentric deposit used. (3, 6 mm) (Fig.8.b)

**8.b**



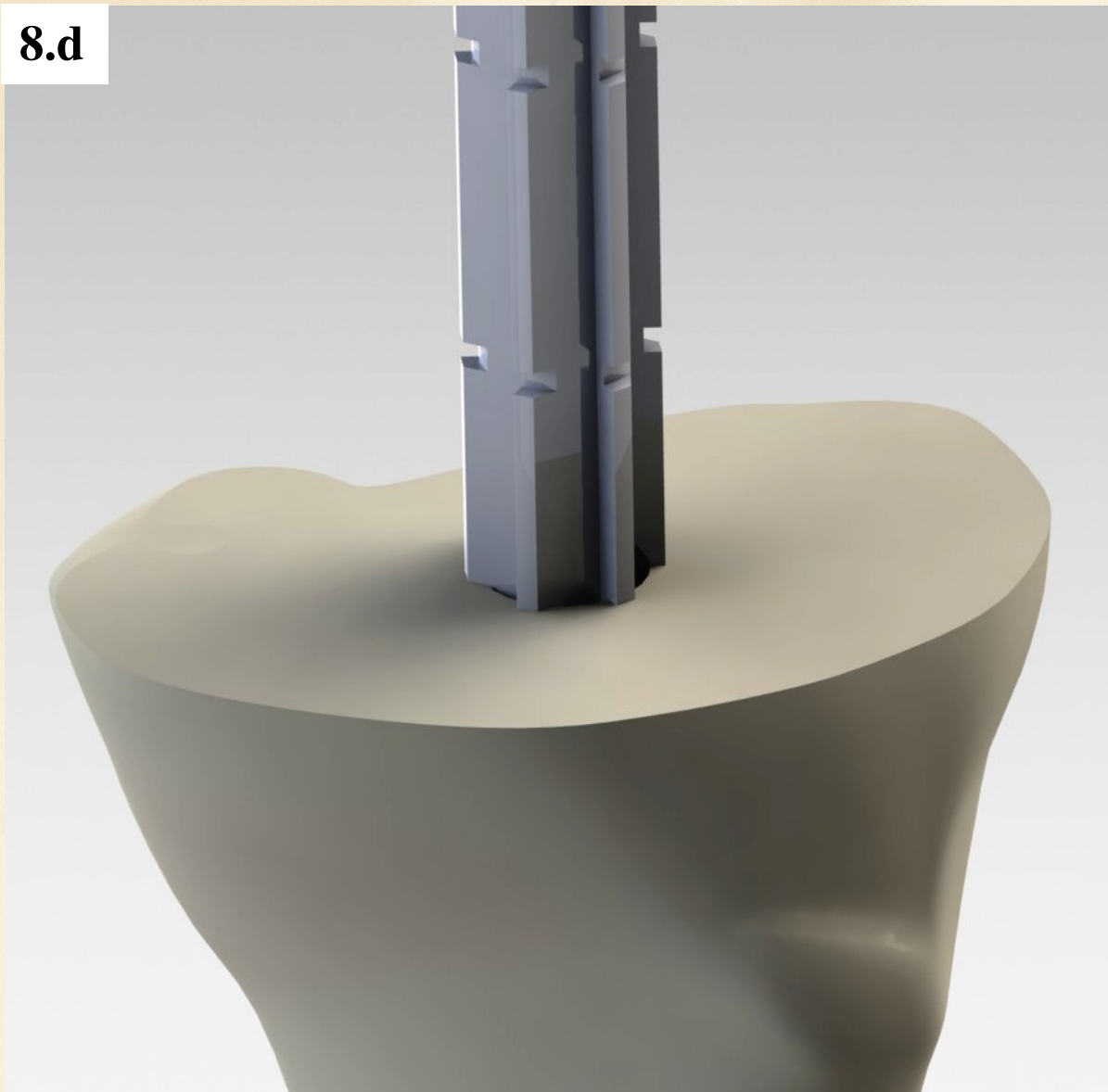


3. Through the hole with drill on the offset to drill the tibial bone (it is hole of the revision stem)  
(Fig.8.c)

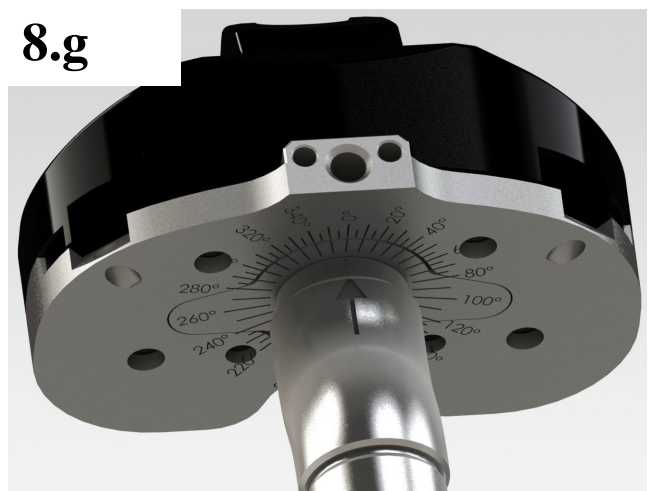
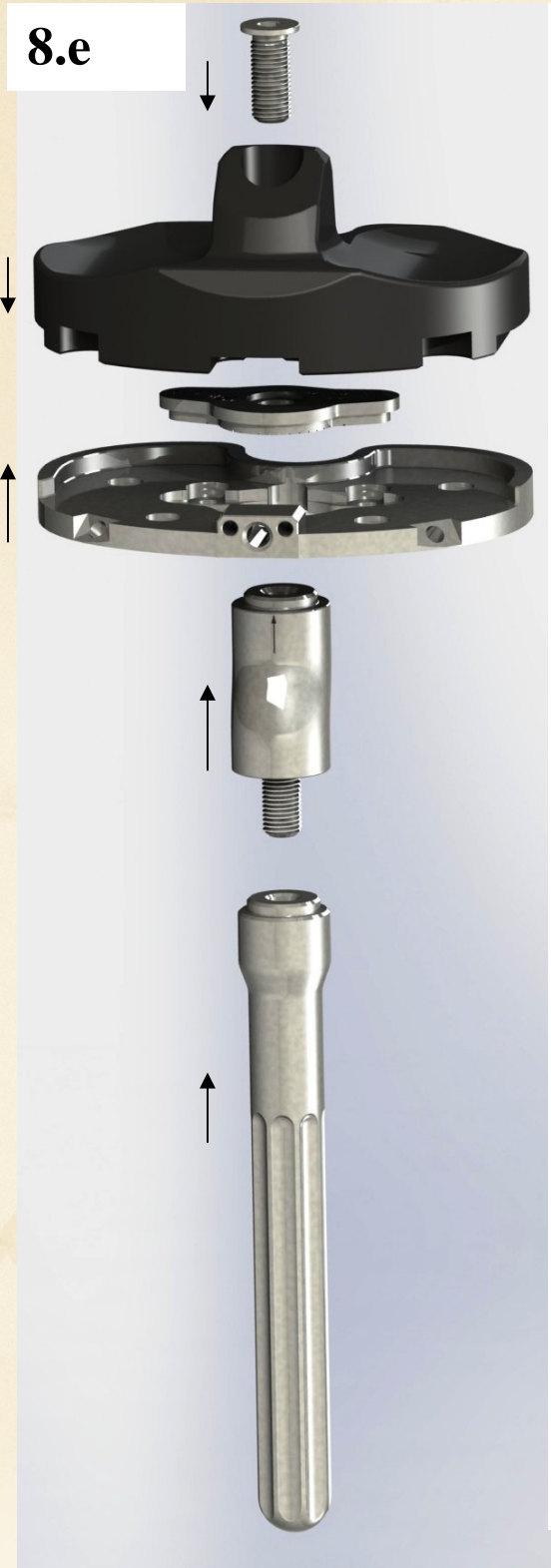


4. Remove the offset guide and the tibial tray trial with a nails, then the hole deepens and widens with the reamer to the necessary into the stem size. (Fig.8.d)

**8.d**



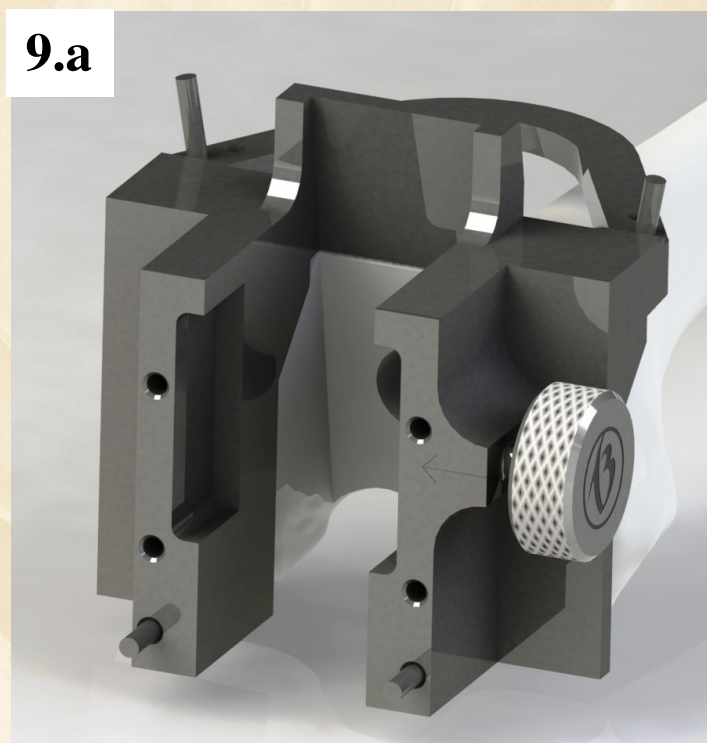
5. The picture of the installation sequence and taking into account the build up tibial tray with inlay, and revision stem with offset with screw. The resulting two units is assembled to the side of the offset signal from the tibial tray at the bottom of a scale to the value set by the offset gauges showed. The assembly to the inlays through a bolt fixed with to the part number 725-0021-0021. The tibial tray trial inlay be seamlessly replace, adjust to the required height. (Fig.8.e, f, g)



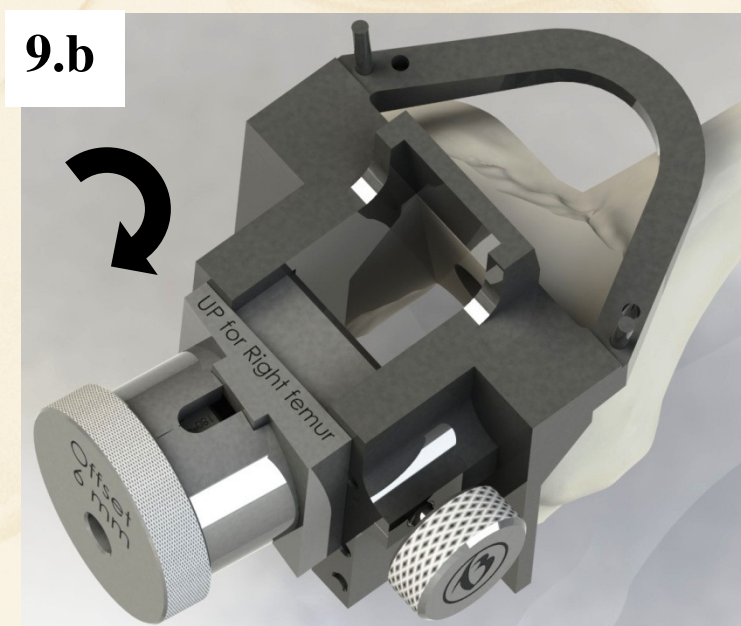
## 9. OFFSET USING THE MEASUREMENT AND MANAGEMENT FOR FEMORAL

If the bone loss equal to or require the deformation, the revision of the femoral component and stem offset supply must be included. In order to offset as far as possible we can build offset guide is needed. The offset measurement using the following:

1. The cutting block fixed with headless pin on the femoral bone (Fig.9.a)

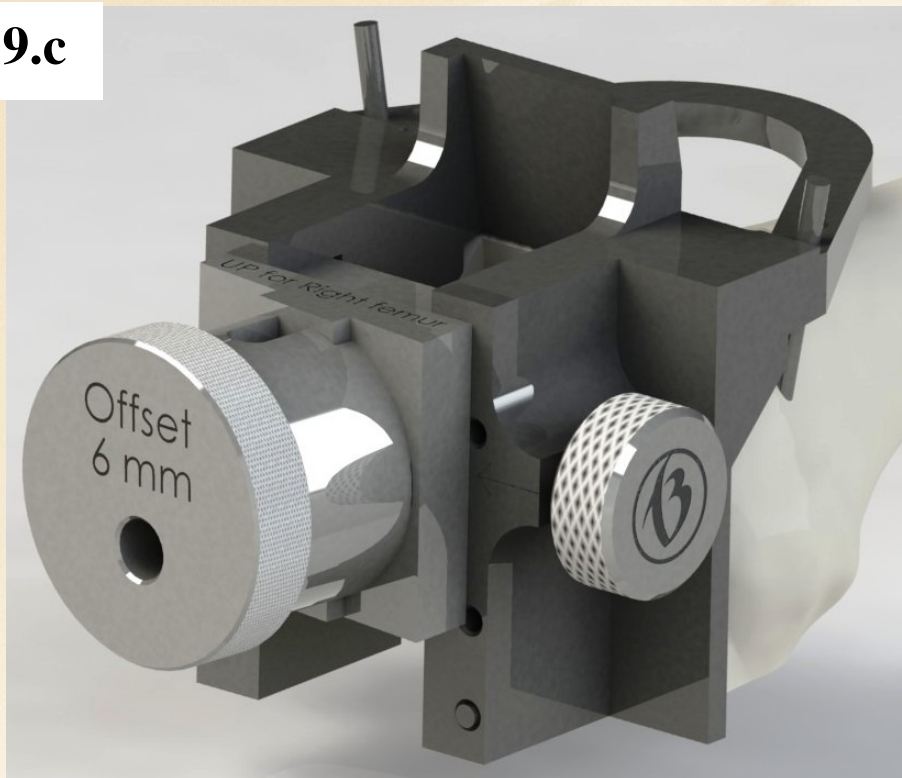


2. Take the offset spacer and the offset guide into the cutting block. The spacer rotated (180°), depending on the left or right femur is used.(Fig.9.b.)

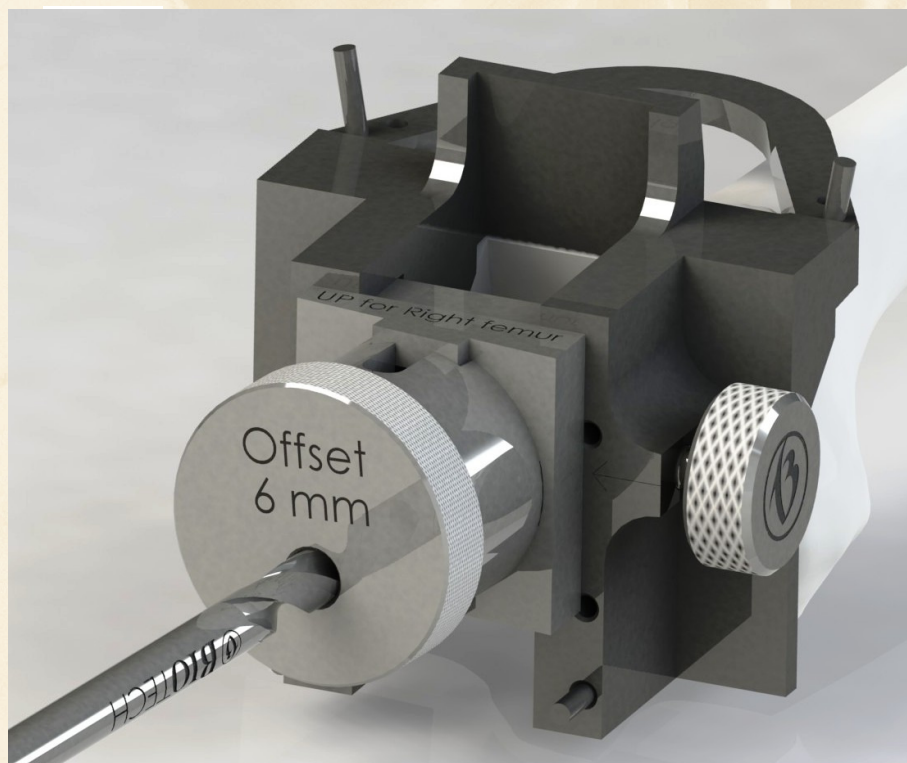


3. The offset guide necessary degrees to rotate. Fixed with locking screw. The offset measurement into two types excentric deposit used. (3, 6 mm) (Fig.9.c)

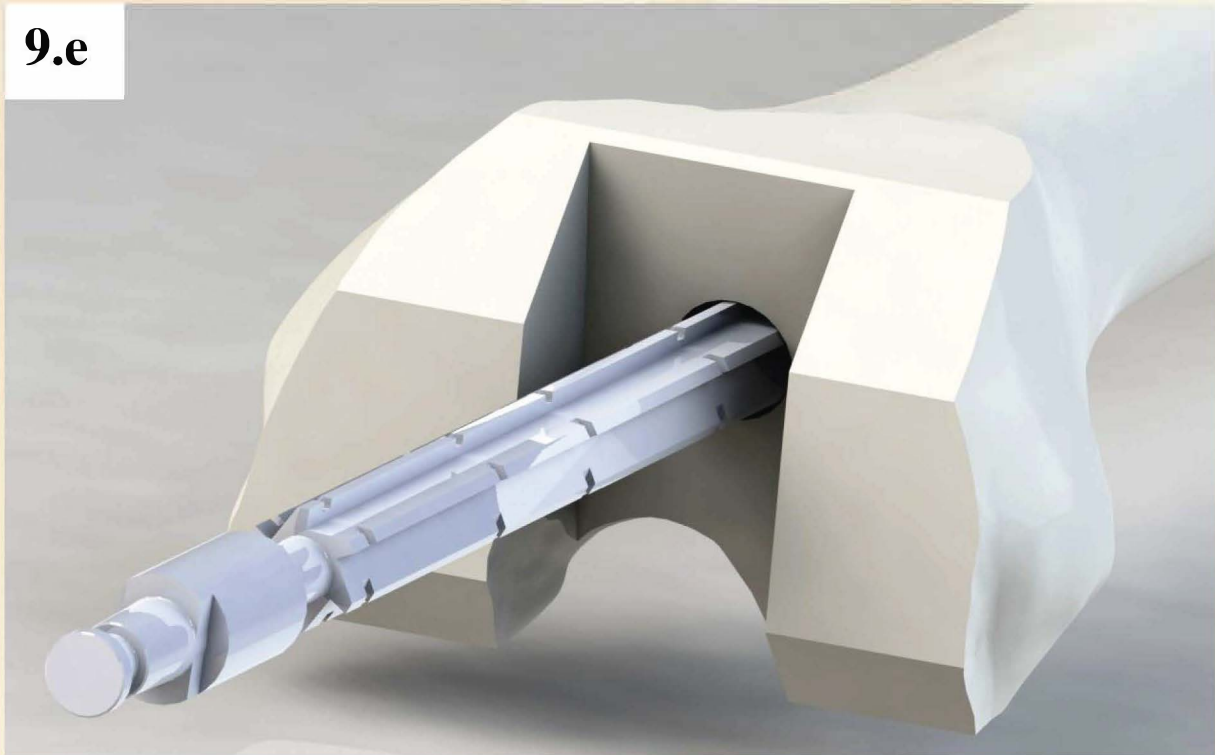
**9.c**



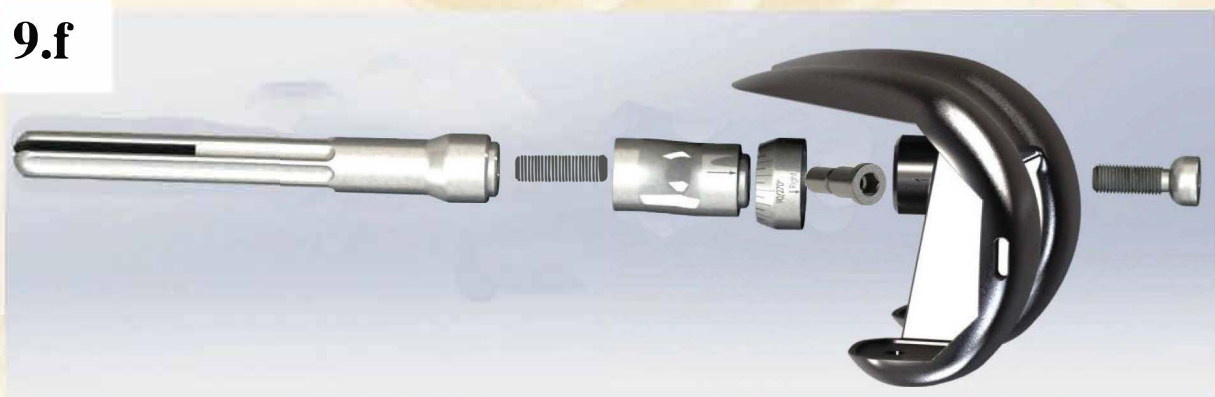
4. Through the hole with drill on the offset to drill the femoral bone. (Fig.9.3) (this is hole of the revision stem position) (Fig.9.d)



5. Remove the offset guide, offset spacer, and the cutting block with pins, then the hole deepens and widens with the reamer to the necessary into the stem size.(Fig.9.e)



6. The exploded view shows the installation sequence. The revision stem rotated into the offset. The offset take on the adapter, adjust the necessary rotated angle on the adapter (use the arrow on the offset) and which is fixed to the stem screw and locking screw. This assembly put the femoral implant and rotate until the arrow on the adapter collinear the marked on femoral implant (Fig.9.g) fixed with the femoral screw. (Fig.9.f)



Assembly sequenses:

1. Stem
2. Offset with screw
3. Adapter
4. Stem screw

**9.g**



**9.h**



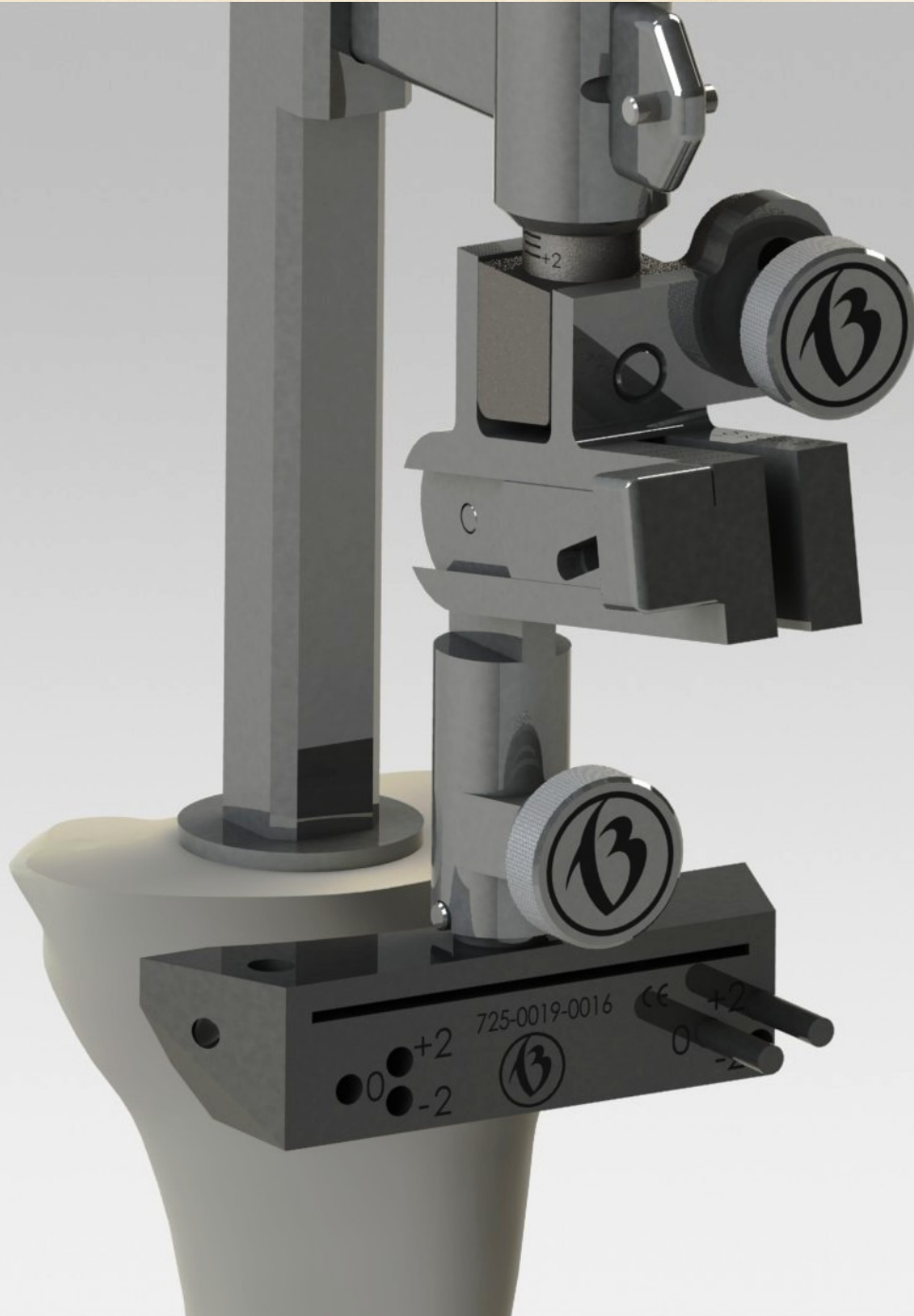
## 10. TAB

### TIBIAL ALIGNMENT:

When asymmetrical bone loss is present the decision to mechanically augment the tibia may be made. After attaching the Tibial Cutting Guide in place (Fig. 10.a), secure the Cutting Block with two to three 2,7 mm drill bits on the unaffected side.

Note: The tibial cut can be made with the standard Tibial Guide followed by the Tab Guide for the affected side or it can be made completely with the Tab Guide.

10.





Remove the entire I.M. Tibial Cutting Guide, including the tibial cutting block. The 2,7 mm drill bits should remain in the non-affected side of the plateau (Fig. 10.b)

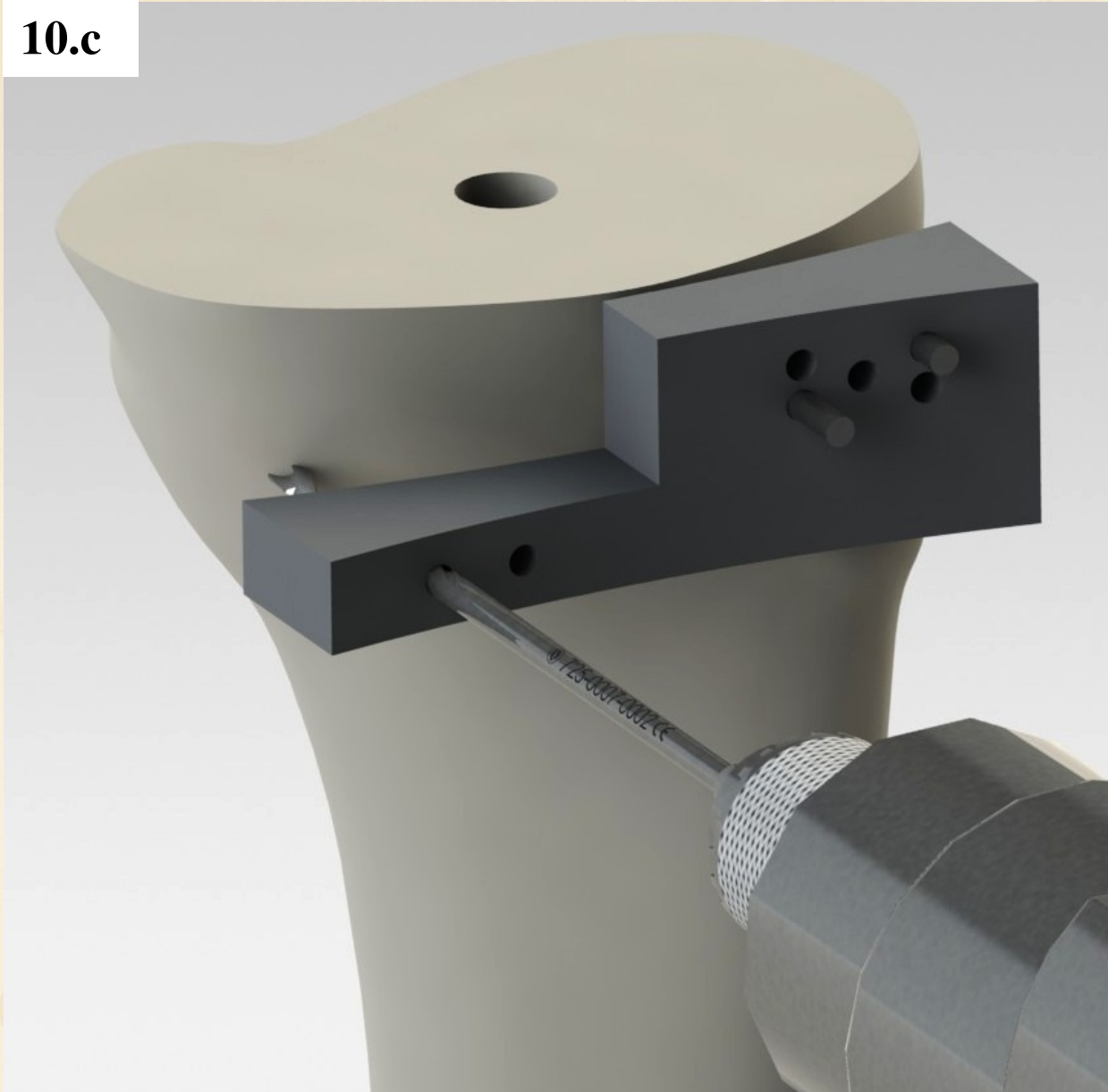
**10.**



## CUTTING BLOCK SELECTION:

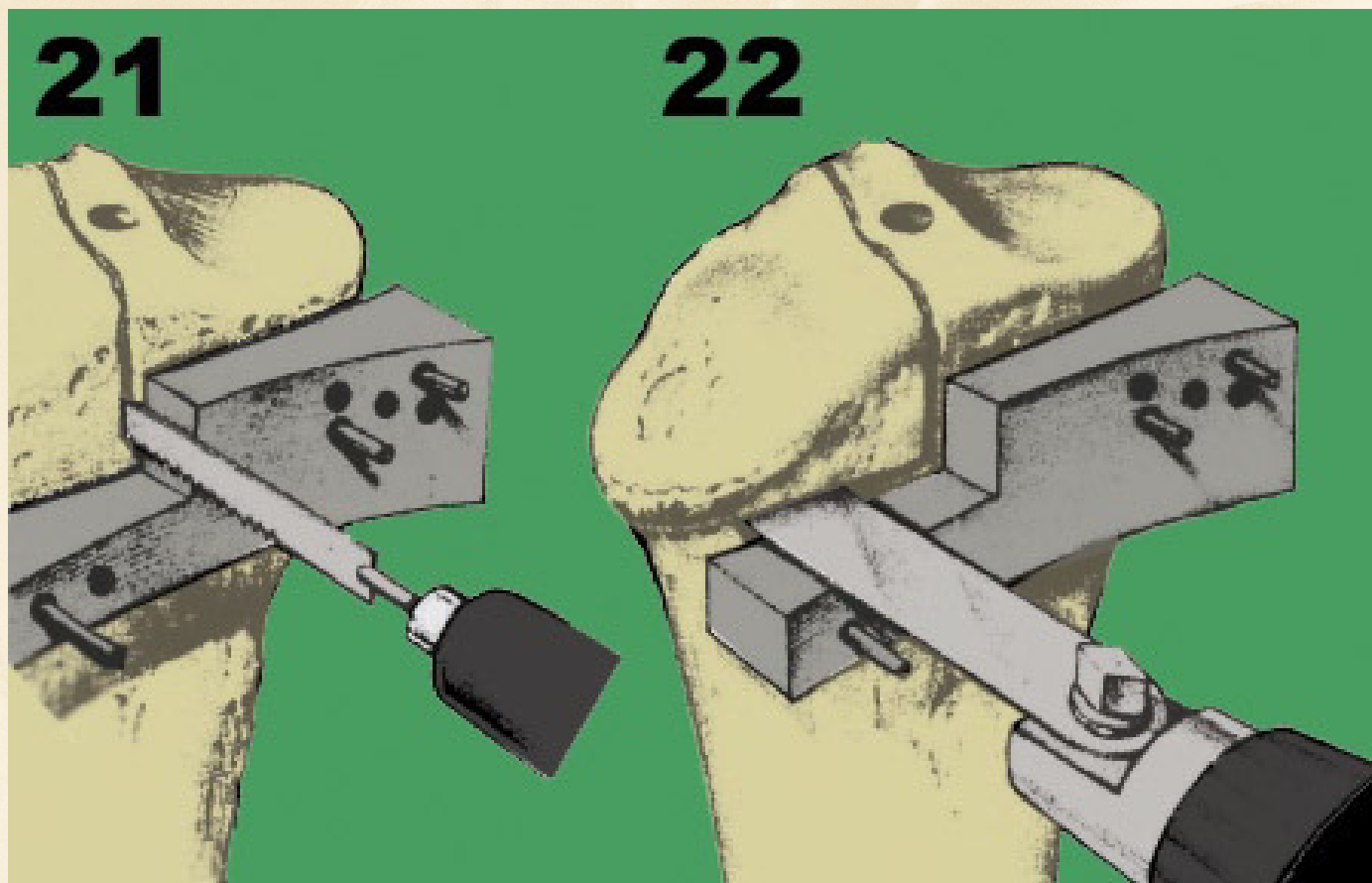
Select the appropriate sized TAB Cutting Block, which most resembles the height of the existing tibial defect. Place the TAB Cutting Block onto the tibial surface, over the previously placed drill bits. Secure the TAB Cutting Block to the tibia with an additional 2,7 mm drill bit on the affected side (Fig 10.c.). Confirm that the cutting block position and rotation are correct.

**10.c**



### **PROXIMAL TIBIA RESECTION:**

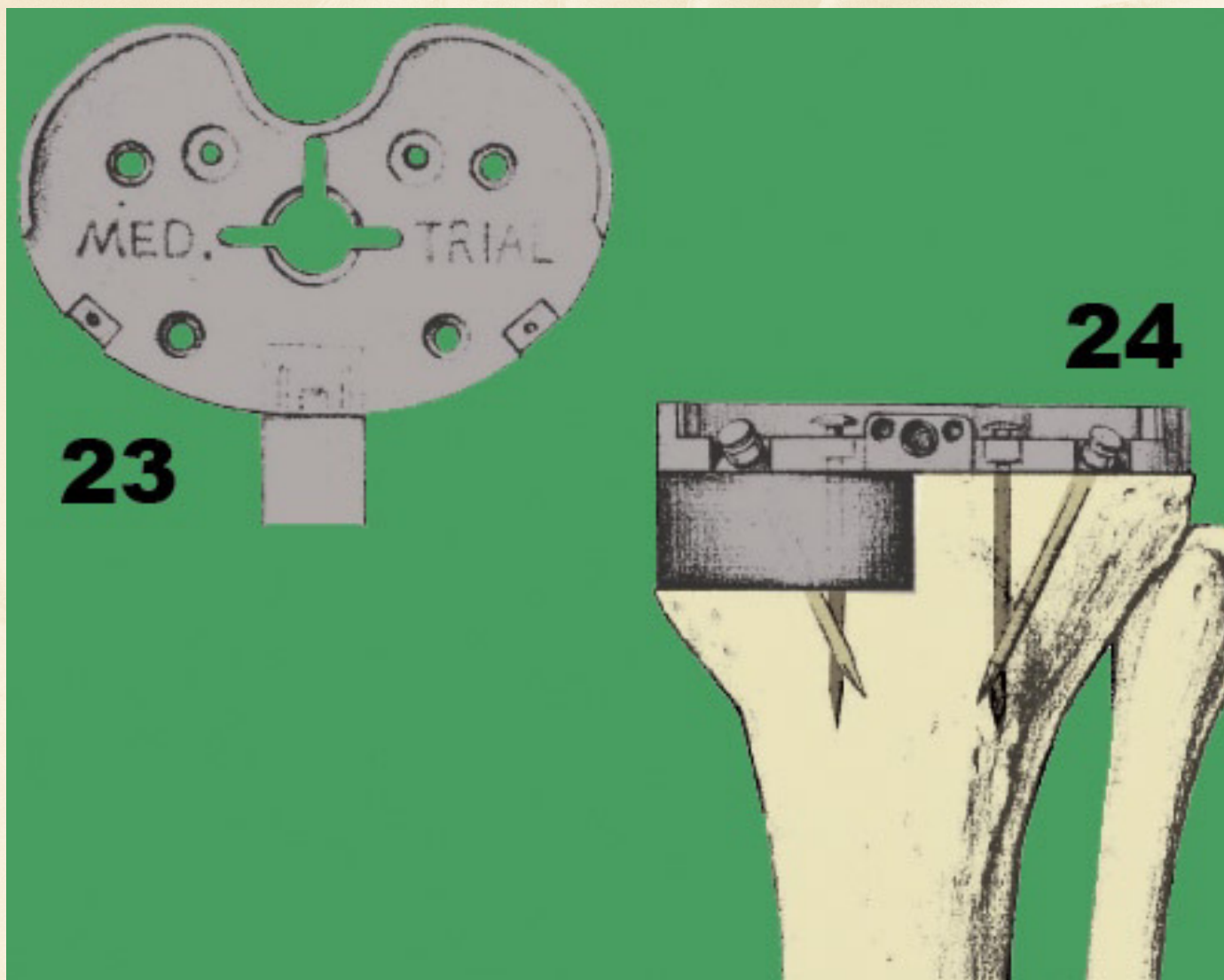
Using a reciprocating saw, complete the vertical resection of the tibia (Fig. 21). Leave the cutting block in place. Using sagittal saw, complete the horizontal cut (Fig. 22) The posterior cruciate ligament, if intact, should be identified and outlined to prevent ligament compromise.



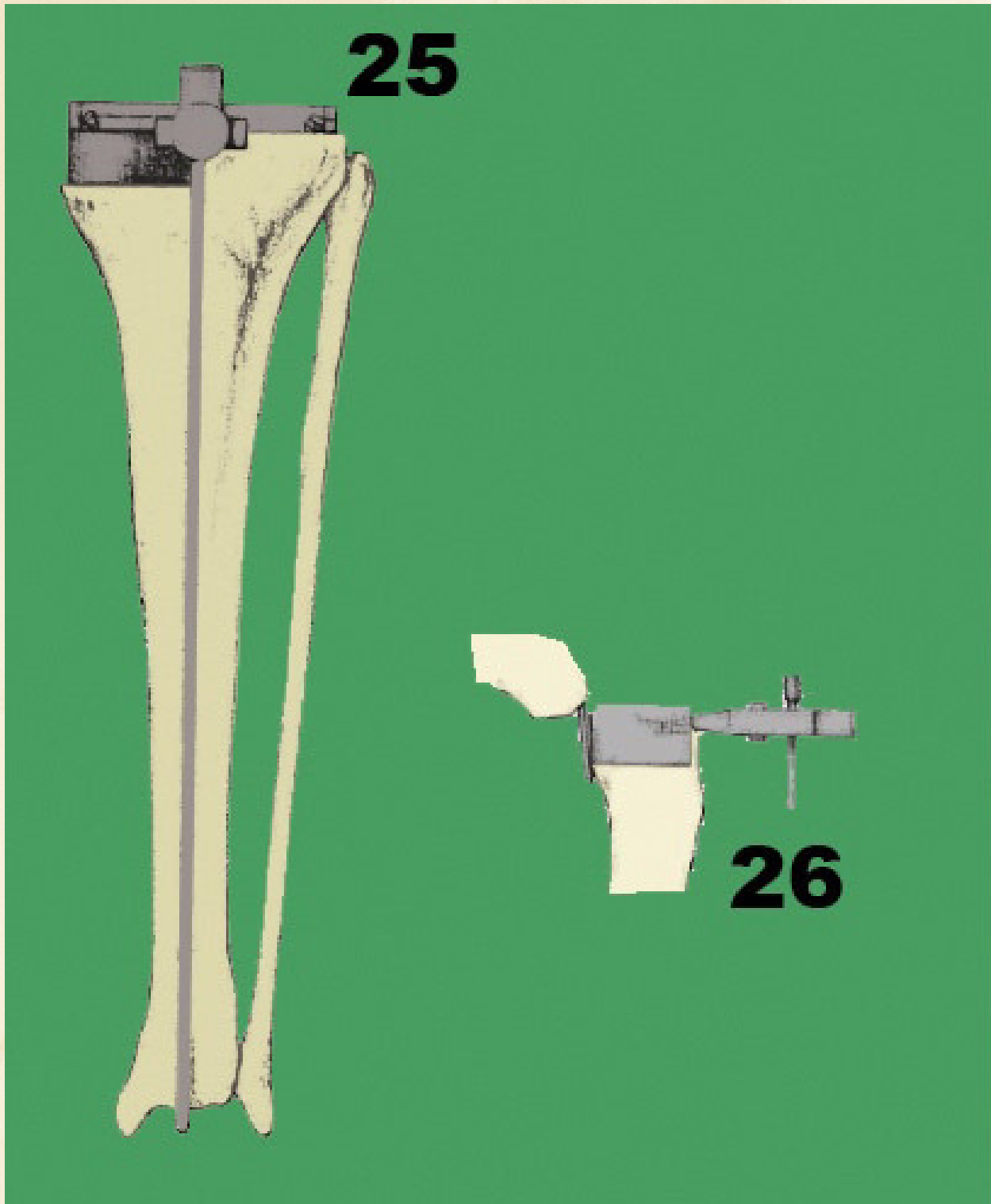
## TRIAL COMPONENTS:

Remove the Tibial Cutting Block and drill bits. Select the appropriate Tibial Tray trial. Select the appropriate TAB trial (Fig. 23). Place the TAB Trial into the defect under the Tray Trial and secure them to the resected tibial surface using three or four pins (Fig.24). Check the trial position for M/L and A/P plateau coverage. Attach the Tibial Tray Trial Handle to the secured Tibial Tray/TAB Trial.

For using trial tibial stem with the trial tibial tray, use the central adapter component of the tibial trial tray.

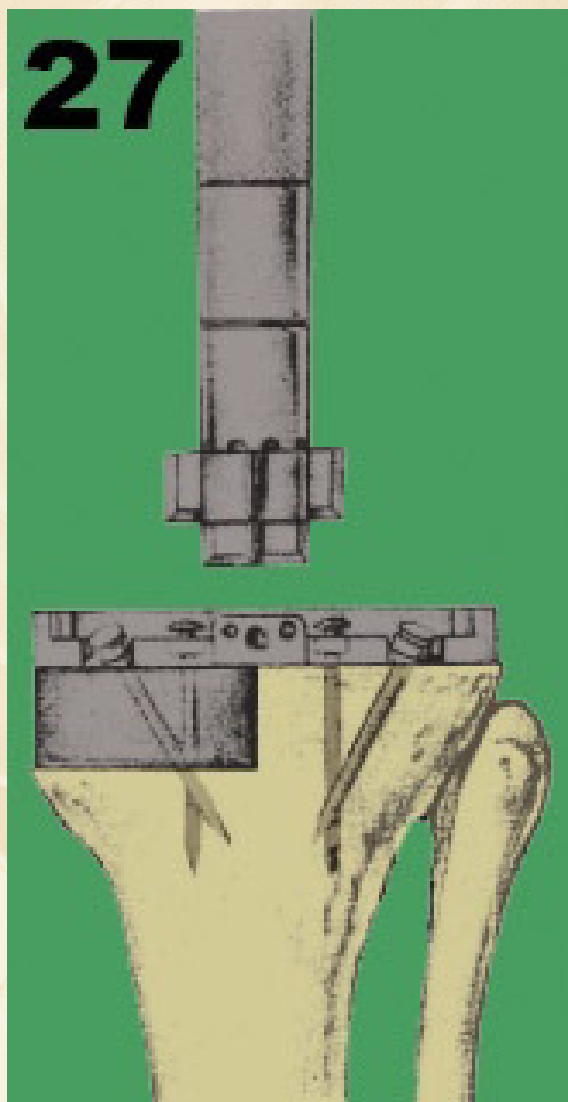


Insert the Tibial Alignment Rod into the Tibial Tray Trial Handle. Determine that the Tibial Tray and TAB Trials are properly positioned on the tibial plateau (Fig. 25./26.) Remove the Trial Handle and Alignment Rod. Perform a complete trial reduction and range of motion with all trial components.



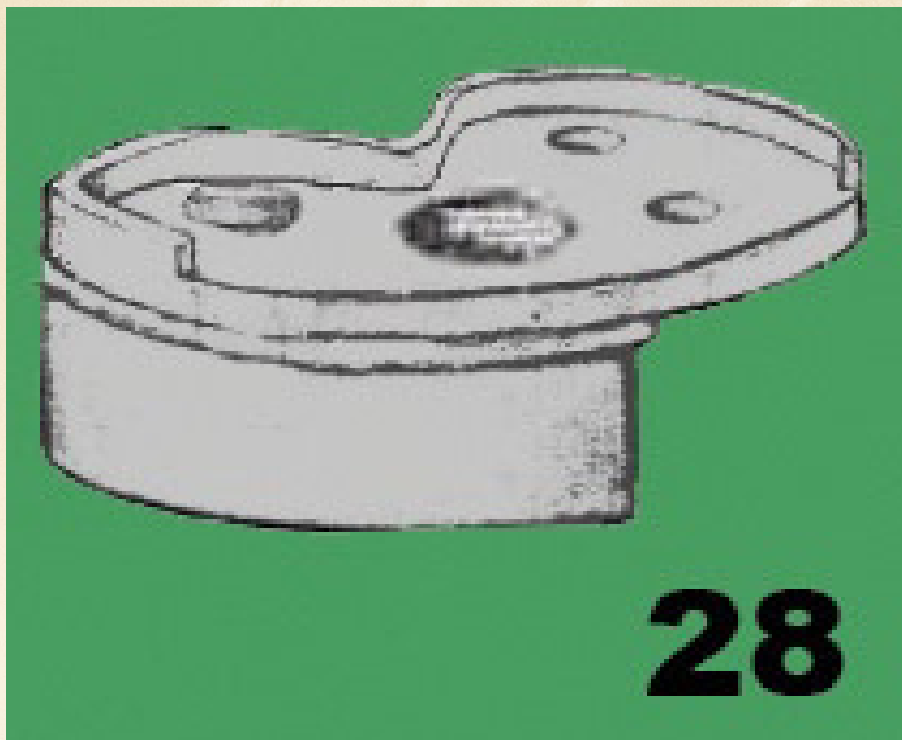
## TIBIAL STEM PREPARATION:

Once final positioning has been confirmed, insert and impact the Tibial Starter Punch through the center of the Tibial Tray Trial (Fig. 27). Remove the Tibial Tray and TAB Trials.



**DEFINITIVE COMPONENTS:**

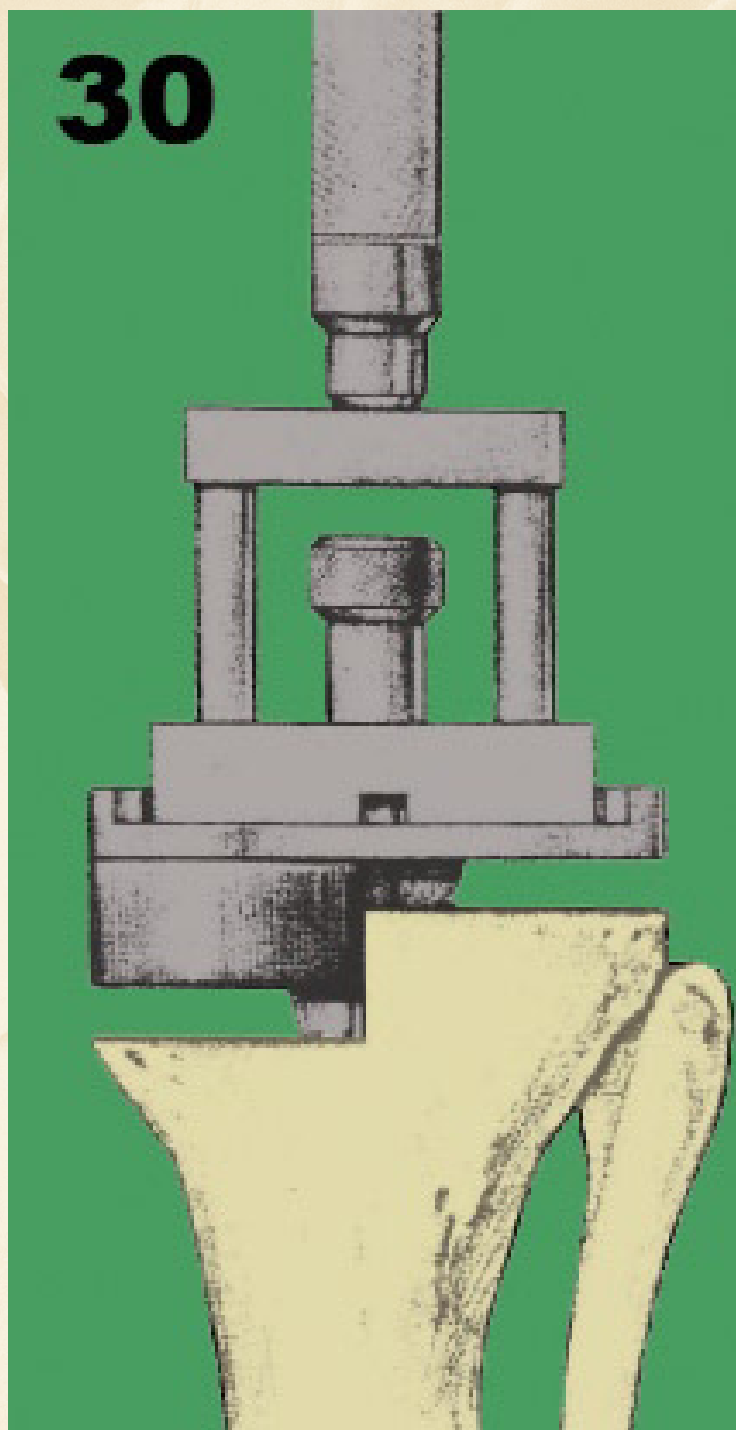
Once the implant selection is confirmed, affix the Tibial Tray to the TAB Implant using the TAB fixation screws. (Fig. 28).



Assemble the Tibial Tray Component with the Tibial Stem. (Fig. 29).



After fixing the tibial components, the Tibial Tray is assembled onto the Tibial Tray Inserter and is impacted onto the prepared tibial plateau (Fig. 30.) A final trial reduction may be performed using a Tibial Insert Trial to confirm the appropriate tibial component height. Once selected, the Tibial Insert is slid into the Tibial Base-plate and snapped into place using the Tibial Insert Impactor. Use the Tibial Locking Screw to secure the insert, base-plate and stem.

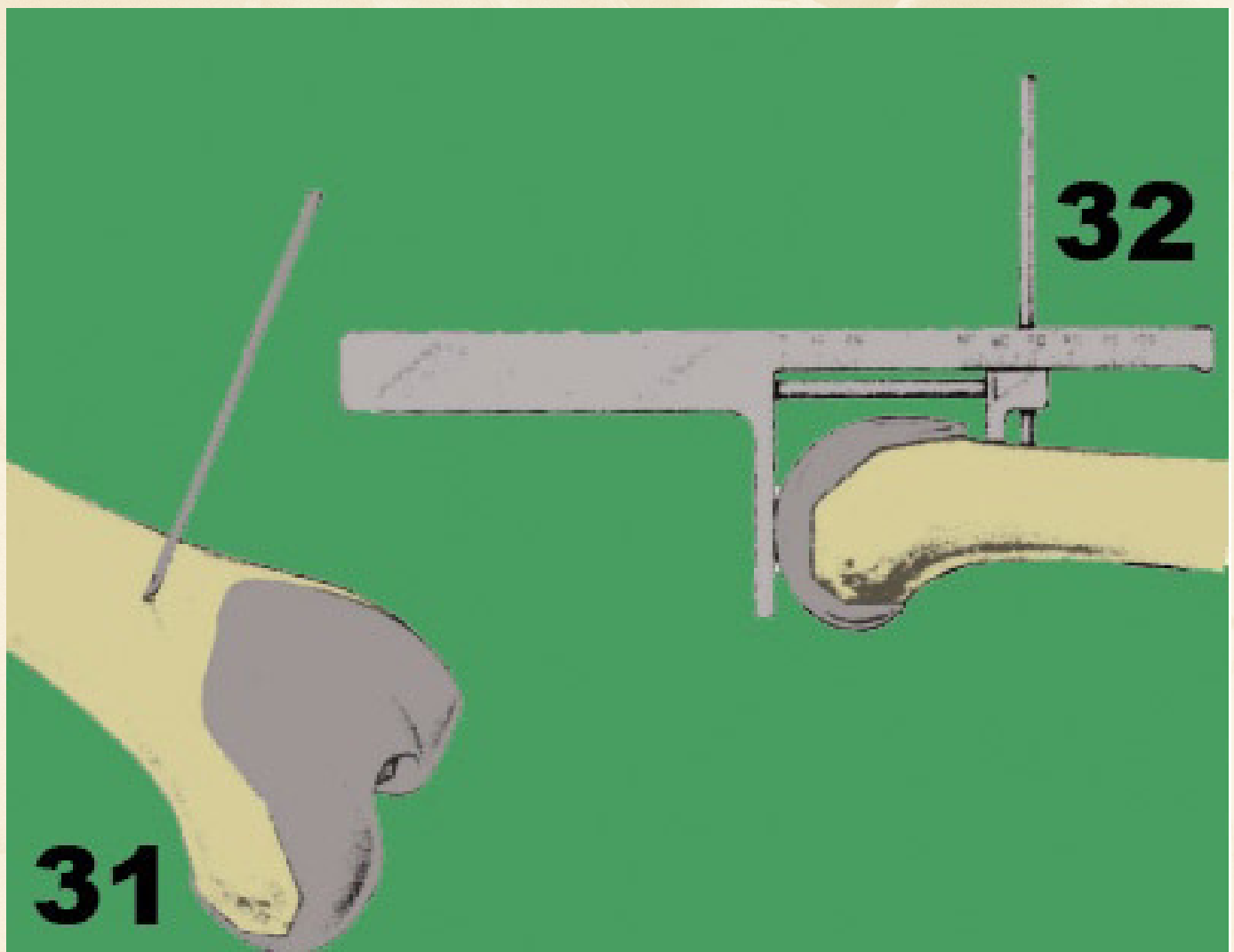




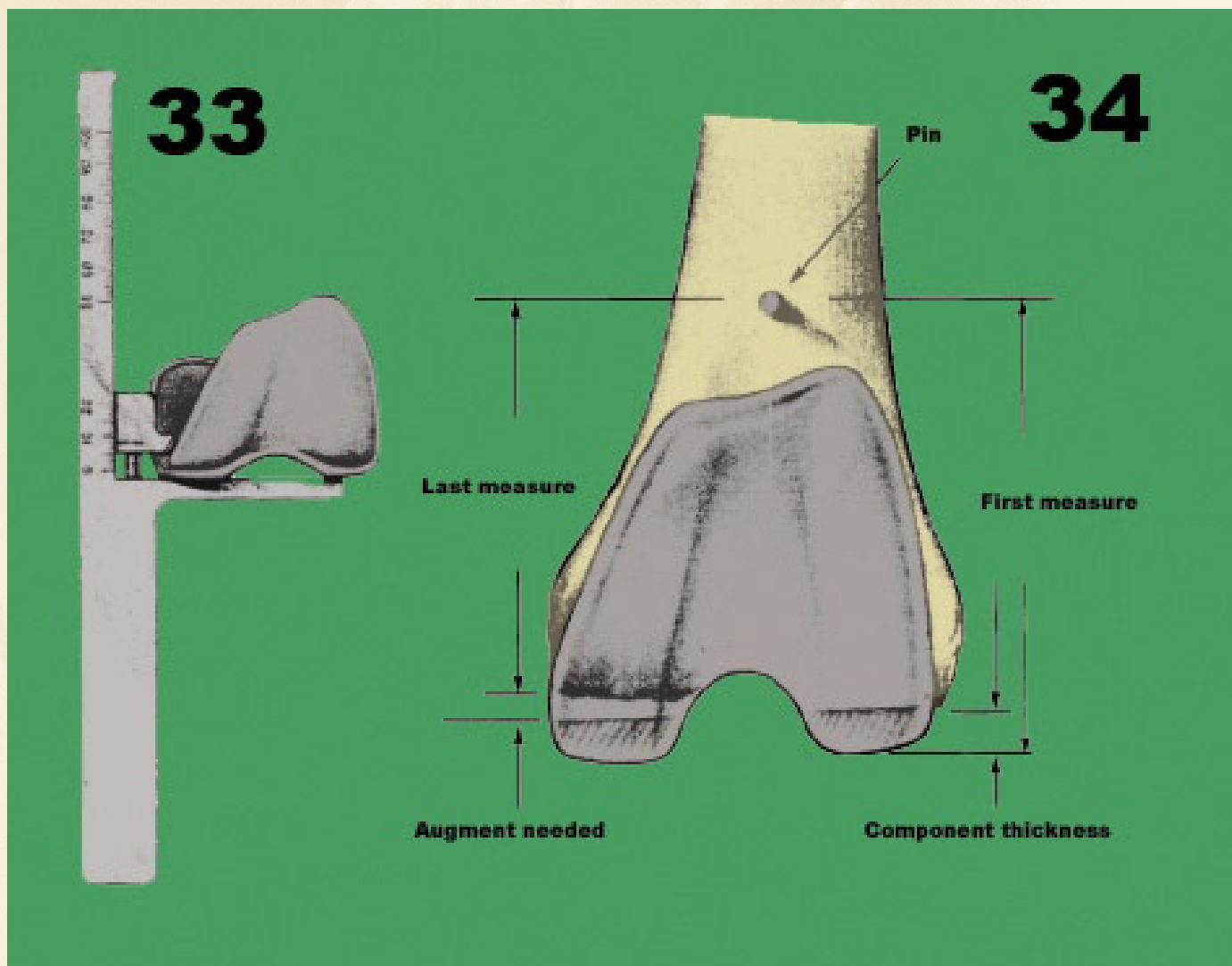
## 9. FAB

### MEASURE CHECK:

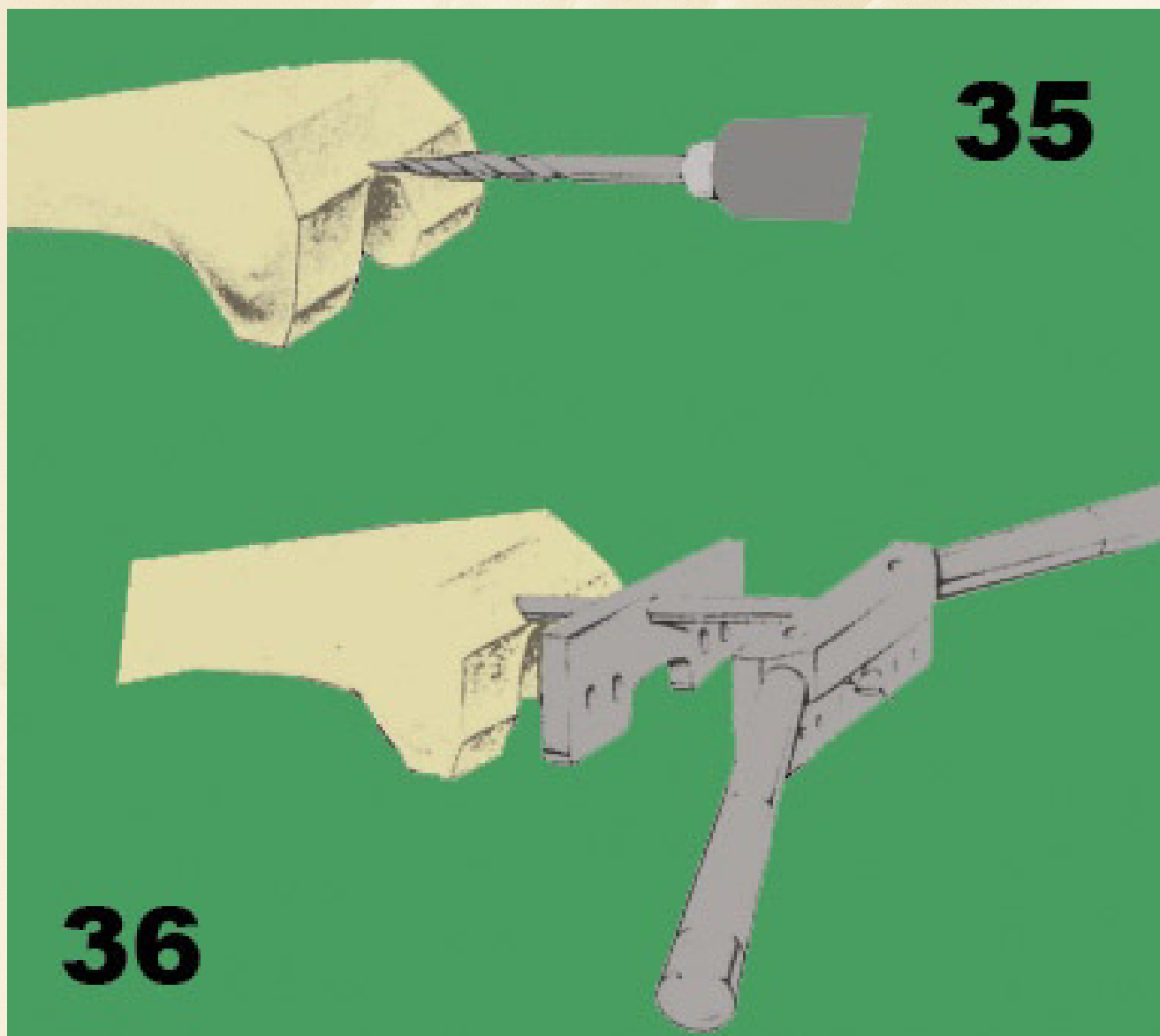
In order to obtain your initial reference measurement of the femoral articular surface first insert a 2,7mm drill into the anterior aspect of the femoral cortex, approximately one inch superior to the edge of the existing prosthesis (Fig. 31). This may require lengthening the surgical incision to provide exposure. If the case is a revision, leave the existing femoral component in place. Using the Distal Resection Gauge, place the hole in the proximal end of the gauge over the drill bit. Adjust the caliper portion (distal end), of the gauge until it rests against the distal aspect of the femoral component. Read the distance from the drill bit to the distal outer aspect of the femoral component on the edged proximal portion of the gauge, in millimeters (Fig. 32.). Remove the gauge, leaving the drill intact.



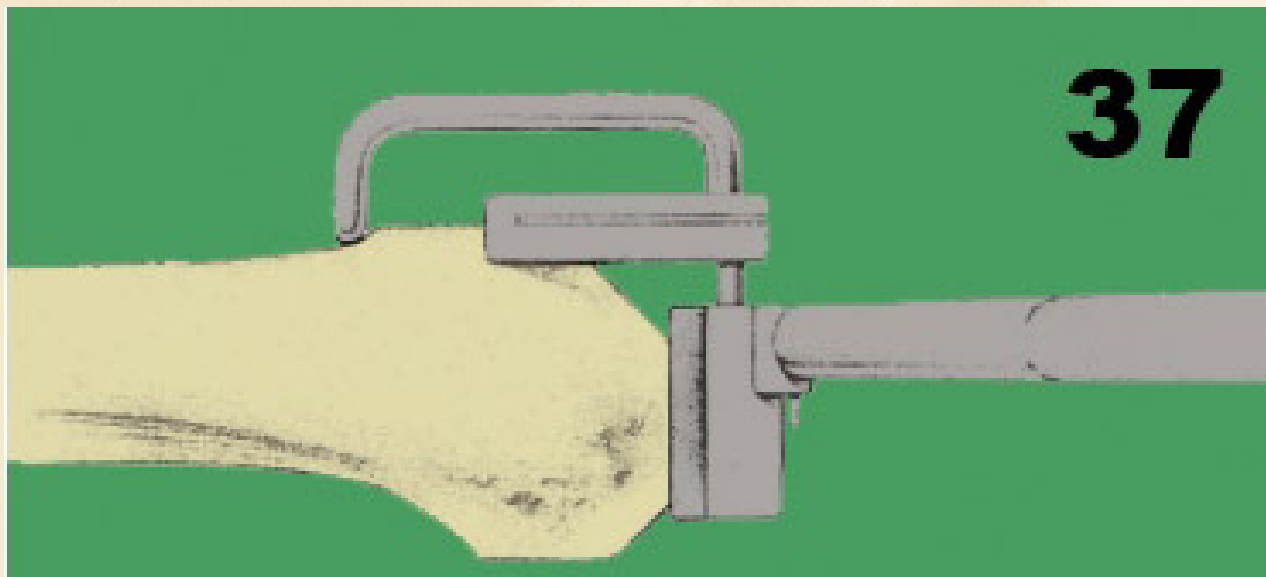
Remove the femoral component. Use the Distal Resection Gauge to measure the thickness of the distal portion of the component (Fig. 33). Re-apply the Distal Resection Gauge over the drill bit and place the calliper portion of the gauge on each of the surfaces of the affected distal condyle(s). If both condyles are involved, use the measurement representing the more severe defect. Read this increment in millimeters. Subtract the thickness of the component and the length of the remaining bone stock from the component thickness originally measured. This number reflects the amount of bone to be augmented, in order to maintain limb length and joint symmetry (Fig. 34)



With the 8 mm Drill prepare an opening in the distal femoral canal. Orient the drill and I.M. Rod parallel with the anterior femoral cortex in order to avoid notching the femur and to allow solid femoral component contact (Fig. 35). Insert the Femoral Alignment Rod into the femoral canal. In the case of revision, place the Distal Spacer between the distal, surface on the femur and the IM Alignment Guide (Fig. 36). Drive the I.M. Guide into the femoral canal until the Guide or Distal Spacer contacts the distal surface of the condylar bone.



If there is excess bone on the anterior surface of the femoral condyles, attach the Anterior Femoral Cutting Guide to the Femoral I.M. Guide. Tighten the Handles to lock in place. Resect the excess bone (Fig. 37). Remove the Anterior Cutting Guide.

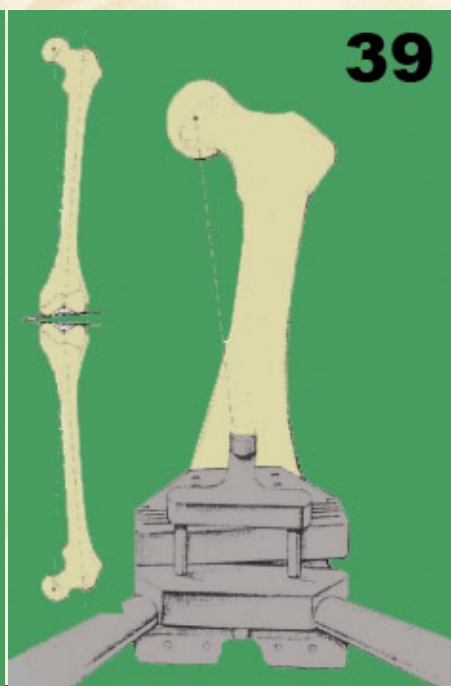


Upon removing the Anterior Femoral Cutting Guide, and removing additional osteophytes from the anterior surface of the femur, the cut is checked for flatness. The Distal Revision Cutting Block is selected for either a left or right femur (left or right facing up). The Revision Distal Cutting Block is attached to the Distal Alignment Guide and then placed into the Femoral I.M. Guide. When possible, the Distal Cutting Block should rest against the femoral anterior cut. The Distal Alignment Pin is inserted into the Distal Alignment Guide and the appropriate angle hole on the Distal Cutting Block is selected based on the planned varus-valgus cut to be made on the distal femur (Fig. 38). The Distal Alignment Pin secures the angle and prevents movement of the guide. The block is secured to the bone by placing fixation pins or drills through the two holes marked 0.

38



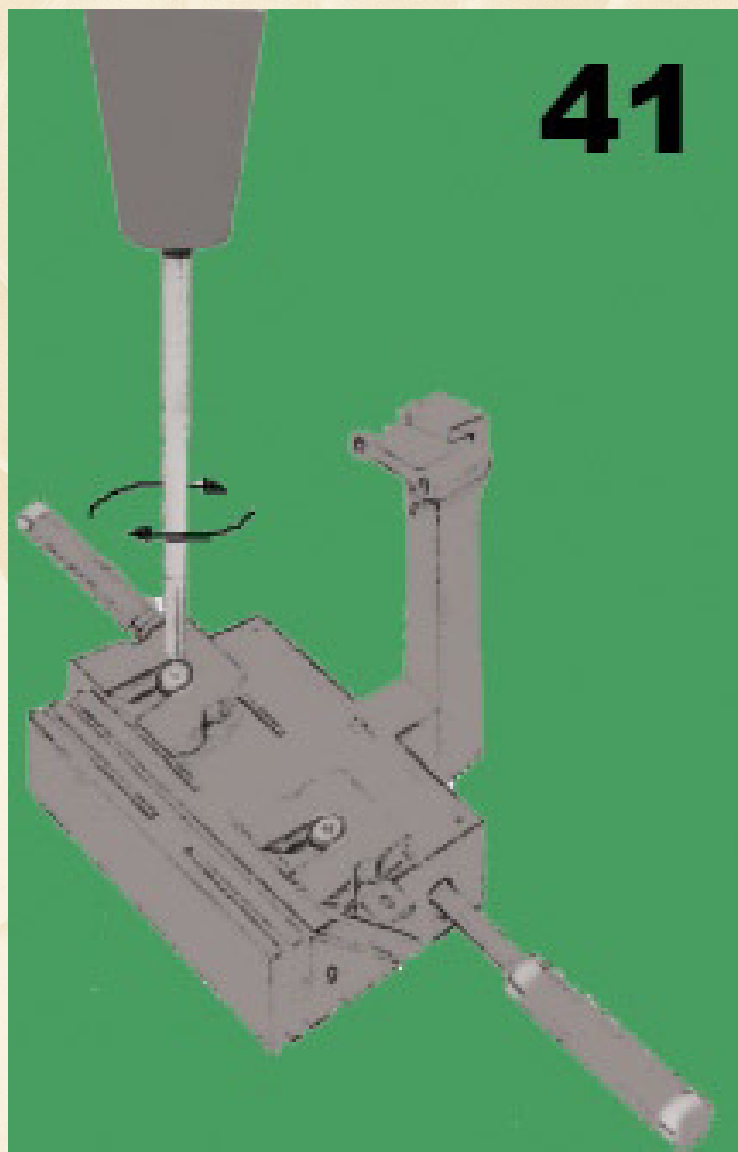
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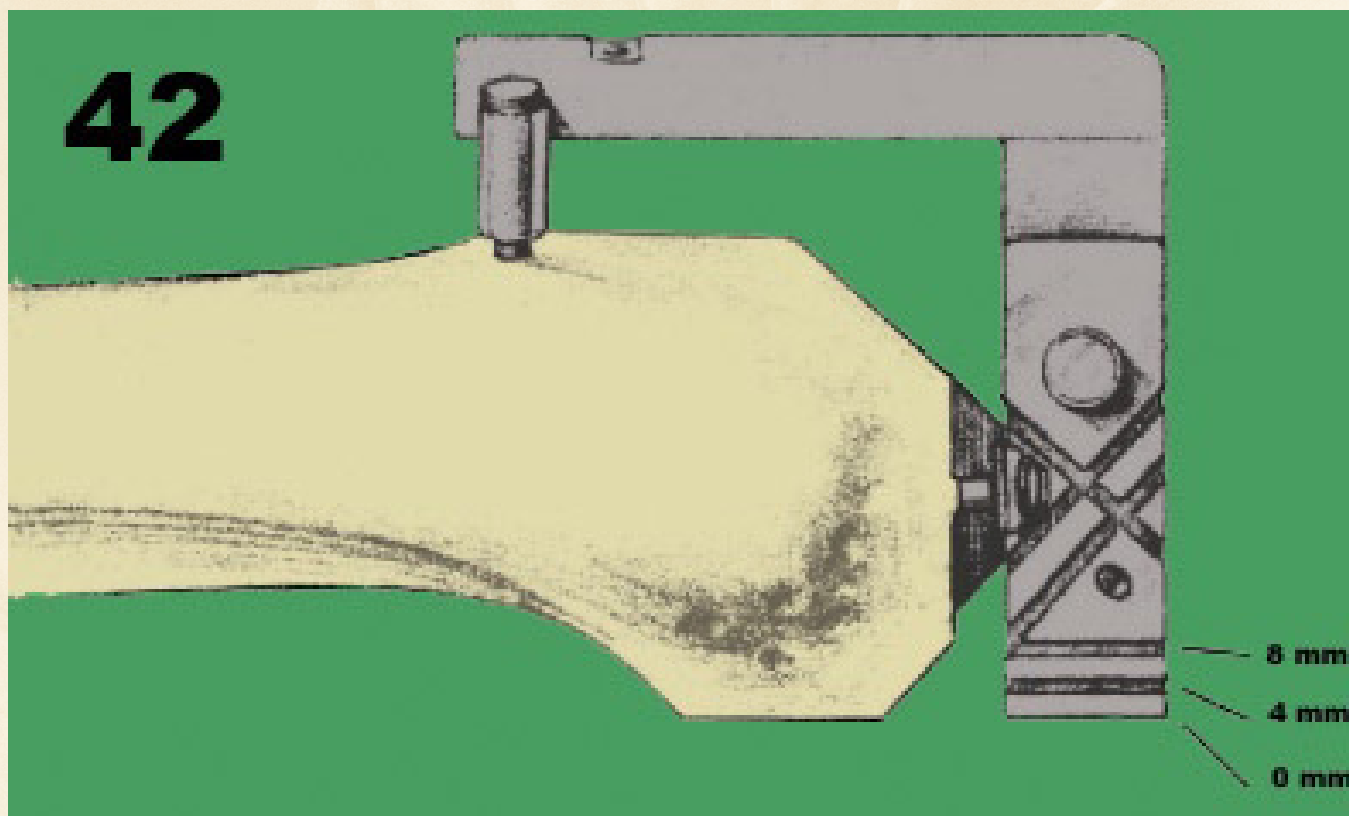
Additional holes are available if further fixation is required. The Femoral I.M. Guide and Distal Alignment Guide are removed. The thickness of the FAB Implants are represented on the Revision Distal Cutting Block (Fig. 40). Make the distal cut. Remove the Revision Distal Cutting Block



Select the appropriate M/L and A/P sized Revision Femoral Cutting Guide. The blocks correspond directly to the actual M/L dimensions of the prosthesis. Attach the Build-up to the inner aspect of the Revision Femoral Cutting Guide using the 2.5 mm Hex Screwdriver (Fig. 41) Place the Cutting Guide flush on the distal condyle surface. Secure with two large pins on the Anterior femoral surface, and with two small pins on the medial and lateral aspects of the distal femur.

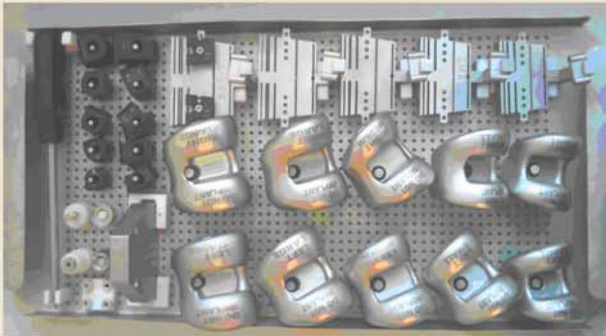


Using the Saw Blade make the appropriate Anterior, Posterior and Chamfer Cuts (Fig. 42). Remove the Cutting Guide.

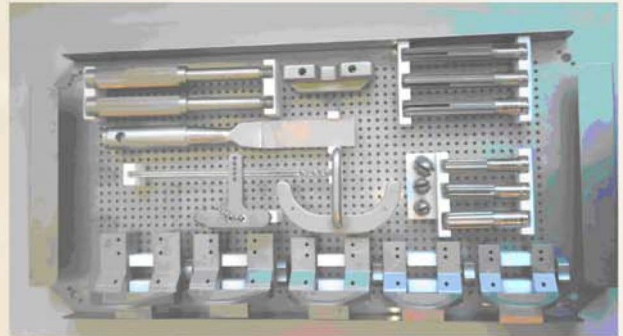


Select the appropriate sized TRK Femoral Component Trial and FAB Component Trial. Using the Femoral Driver/Extractor, attach the Femoral Trial Component to the femur. Assess the fit of the bone-component interface. Take the knee through a range of motion. Determine that the limb length and joint line have been re-established. Remove the trial component. Perform any necessary Tibial and Patellar resections.

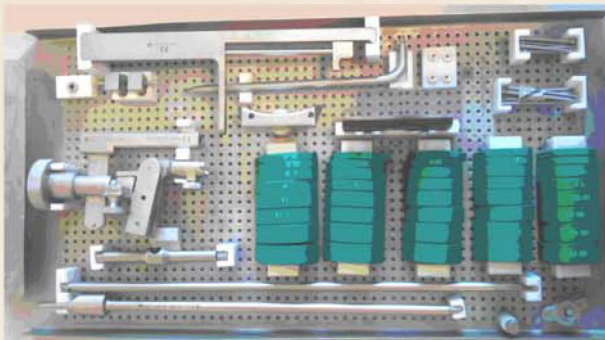
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**725-2017-0002**



**725-2017-0003**



**725-2017-0004**



**725-2017-0005**



  
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