

# Mako<sup>®</sup> Partial Knee

## Medial bicompartamental

### Surgical reference guide



**Mako  
Robotic-Arm  
Assisted Surgery**

**Table of contents**

Implant compatibility . . . . . 3  
Pre-operative planning . . . . . 4  
Intra-operative planning . . . . . 5  
Planning technique tips . . . . . 8  
Initial exposure and array placement . . . . . 9  
Bone registration and gap balancing . . . . . 10  
Fine-tune implant positioning and bone resection 11  
Trialing, soft tissue balancing and implant  
insertion . . . . . 12

This publication sets forth detailed recommended procedures for using Stryker’s devices and instruments. It offers guidance that you should heed, but as with any such technical guide, each surgeon must consider the particular needs of each patient and make appropriate adjustments when and as required.

**Note: the information provided in this document is not to be used as the surgical technique when completing a Mako Partial Knee procedure. Please refer to the Mako PKA Surgical Guide (PN 210713) for detailed intended use, contraindications, and other essential product information.**

## Implant compatibility



**Medial**

**Patellofemoral**

**Lateral**

**Medial  
bicompartmental**

### Mako MCK Implant System

	<b>Options</b>	<b>Sizes</b>	<b>Part number</b>
Femoral implant	Left medial/Right lateral	1-8	18050X
	Right medial/Left lateral	1-8	18051X
Tibial baseplate	Left medial/Right lateral	1-8	18060X
	Right medial/Left lateral	1-8	18061X
Poly insert	8,9,10,12mm	1-8	18070X-X
X3 insert	8,9,10,12mm	1-8	18073X-X
Patella implant	3mm increments	26-41mm	180320-X
Patellofemoral implant	Left	2-8	18040X
	Right	2-8	18041X



## Intra-operative planning

Intra-operative planning sequence: position the medial femoral and tibial components before planning the PF component.

### Medial partial knee

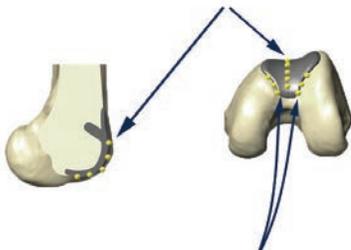
#### To set final placement of the femoral and tibial components:

Remove all visible osteophytes, balance the medial partial knee replacement (PKR) joint gaps, and fine-tune femoral-tibial tracking as described in the Mako Partial Knee surgical reference guide (MAKPKA-PG-2).

- 1 Map 2 points at medial and lateral superior edge



- 2 Map 5 cartilage points along the deepest point of the trochlear groove (most anterior to most distal)



- 3 Map 3 cartilage points along each of the medial and lateral transition zones

### PF component

#### To set final placement of the PF component:

Map cartilage surfaces in the trochlear groove and the distal transition zones of the PF component (figure 4).

1. Collect points on the superior edges of the virtual component (one medial and one lateral).
2. Collect a minimum of five cartilage points along the deepest points of the trochlear groove (Whiteside's line). The most distal point should be collected at the most inferior tip of the virtual PF component.
3. Collect three cartilage points on each of the lateral and medial PF transition edges.

**Figure 4**

The mapped surfaces are now used to fine-tune the virtual implant position to ensure a smooth transition between the implant and the cartilage.

## Intra-operative planning

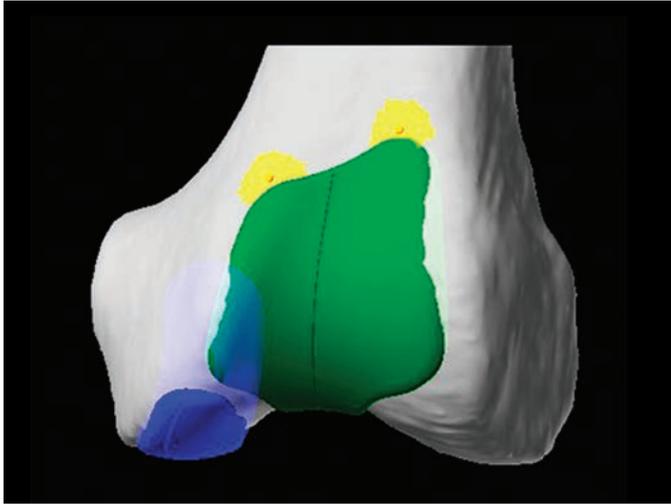


Figure 5

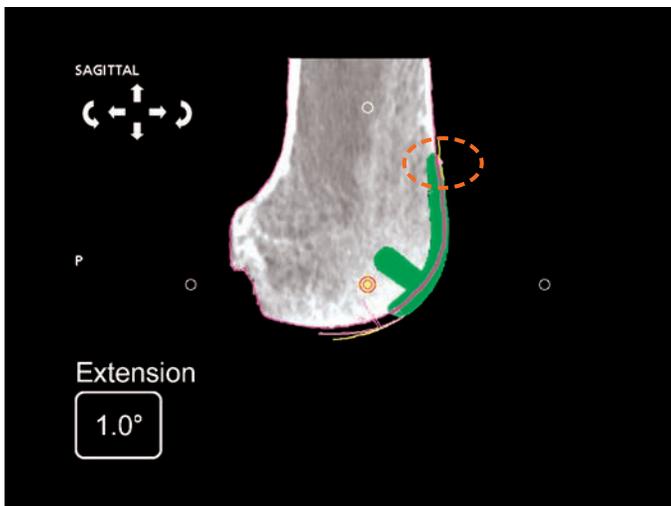


Figure 6

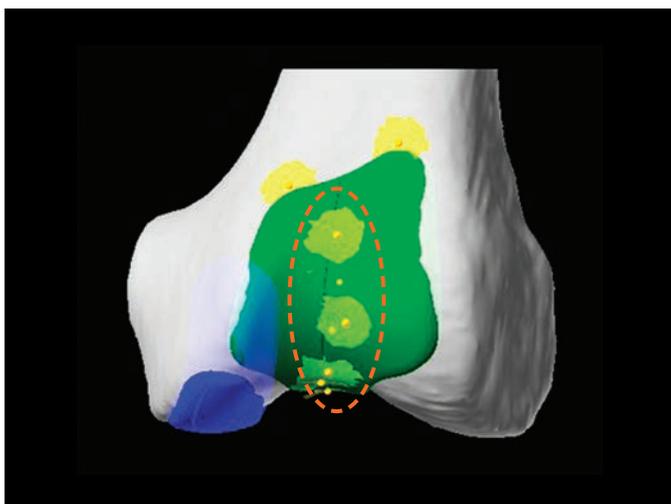


Figure 7

### PF component (continued)

Below are specific instructions on how to fine-tune and establish the final implant position.

1. In the sagittal quadrant, translate the component in the anterior/posterior direction to ensure that the superior-lateral edge of the implant is placed midway through the mapped surface (figures 5 and 6).

Verify that the superior-medial edge of the implant is contacting the medially mapped surface.

2. In the sagittal quadrant, the deepest point of the trochlear groove of the implant should rest on the cartilage mapped in the trochlear groove. To fine-tune, place the crosshair at the superior-lateral flange tip of the implant to set the rotation anchor, manually scroll to the deepest point of the trochlear groove, and adjust flexion/extension as required (figures 7 and 8).

In the same quadrant, verify that there is no interference with the ACL. The PF component should lie anteriorly to Blumensaat's line.

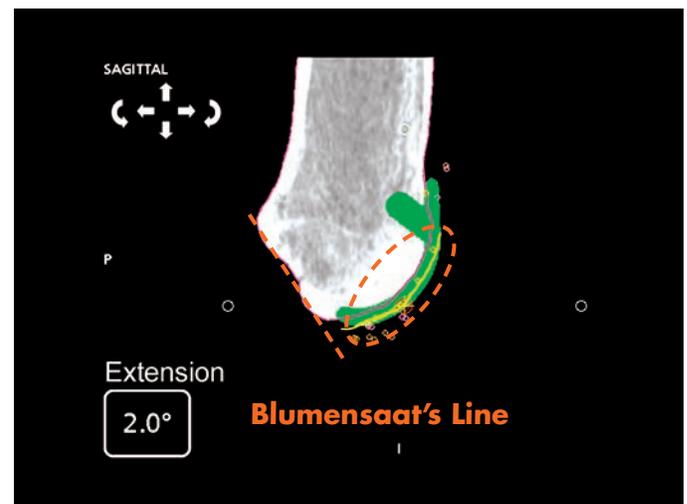


Figure 8

## Intra-operative planning

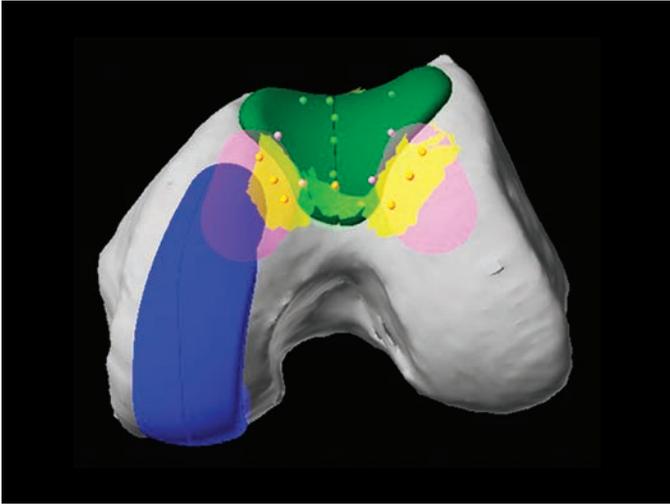


Figure 9

3. Distally, in the sagittal and coronal quadrants, the virtual implant should be flush (or slightly recessed to the cartilage). The mapped cartilage is represented as yellow lines. Adjust superior/inferior (S/I) and varus/valgus of the implant to create a smooth transition from the distal-lateral edge of the component to the lateral cartilage of the femoral condyles. The preferred varus/valgus setting is 0-2° varus (figures 9, 10, and 11).

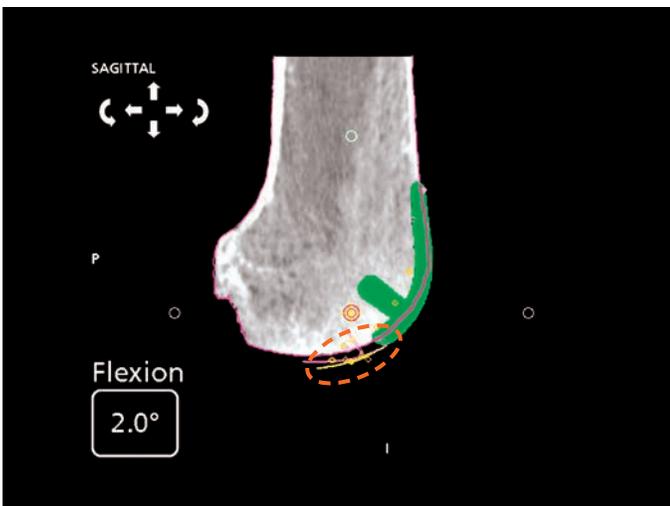


Figure 10

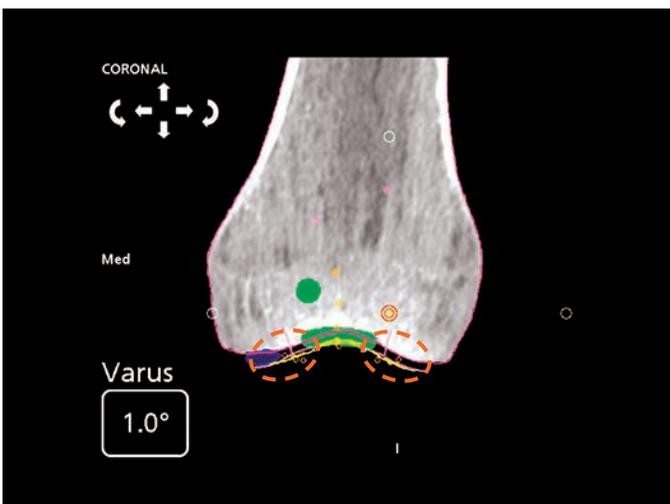


Figure 11

## Planning technique tips

Occasionally it is difficult for the implant to perfectly match the anatomy. Below is the order of importance for the implant to match the mapped cartilage areas:

1. Trochlear groove and lateral femoral condyle transition zone
2. Medial femoral condyle transition zone
3. Superior (proximal) edges of component

Matching the trochlear groove may help prevent overstuffing of the joint and may allow for an anatomical reconstruction. Similarly, a smooth transition, particularly to the lateral femoral condyle, is important for enhanced kinematics and may allow for a smoother excursion of the patella from the condyles to the trochlear component.

On the other hand, contact between the patella and the superior section of the component occurs during full extension when there is little tension in the patellar tendon. Therefore, matching the superior areas is less important.

Proper procedure planning and careful execution allows for precise placement of the PF component. Anatomic resurfacing of the patella is also needed to allow for enhanced kinematics. Exact reconstruction of the patella thickness and shape is as important as proper PF component placement. If the PF component must seat proud on the native trochlear groove, the thickness of the resurfaced patella may need to be adjusted (reduced) to prevent overstuffing.

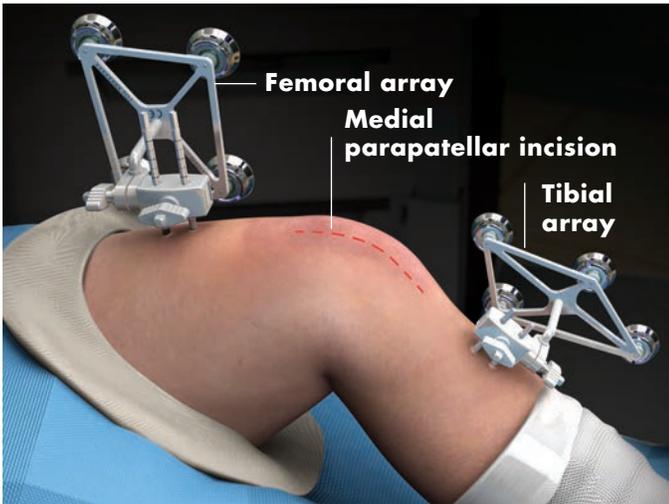
## Final review of implant placement/gap balancing graph

After all adjustments are completed it is important to review the final position of all virtual implants before proceeding to bone resection. This is accomplished by scrolling through the appropriate slices of the bone model in all three planes and confirming proper fit, no impingement, no overhang and smooth transition from the trochlear component into the femoral condyles and the femoral component.

It is also important to verify that the gap balancing chart still yields the desired gaps throughout range of motion.

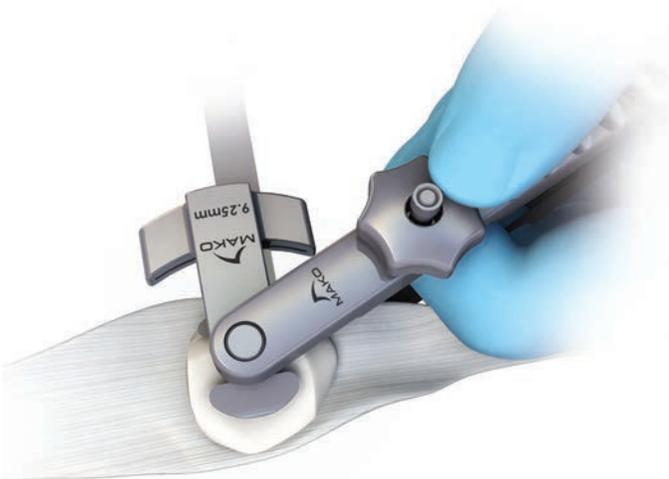
Once the final position of all virtual implants has been verified we can safely proceed into bone resection, trialing and implantation.

## Initial exposure and array placement



**Figure 12**

Perform a medial incision and parapatellar arthrotomy to expose the joint. Place the femoral and tibial arrays, and the femoral and tibial checkpoints.



**Figure 13**

Measure the thickness of the patella and resect it in the customary fashion.

## Bone registration and gap balancing

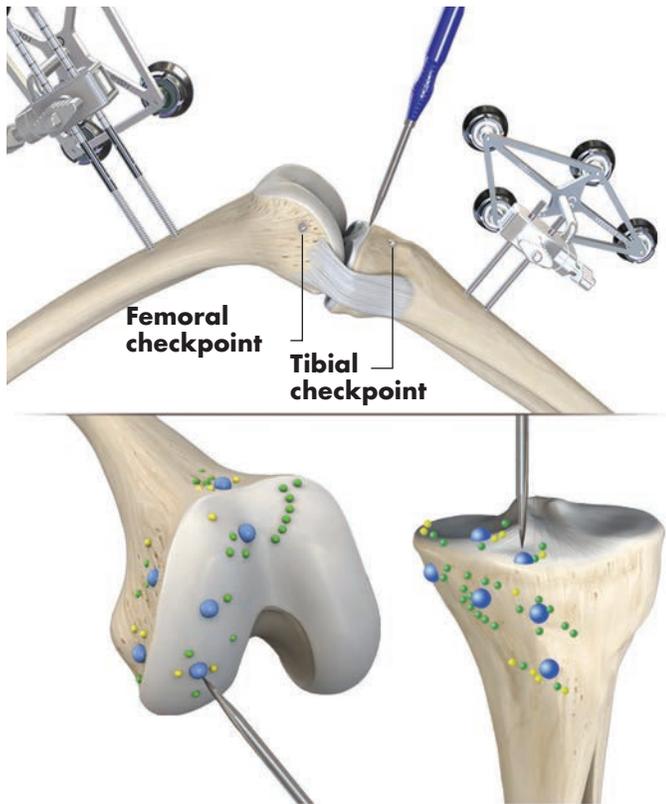


Figure 14

Collect patient landmarks. Register and verify the femoral and tibial checkpoints.

Perform bone registration and verification of both the femoral and tibial surfaces.

**Do not remove osteophytes before bone registration is completed.**

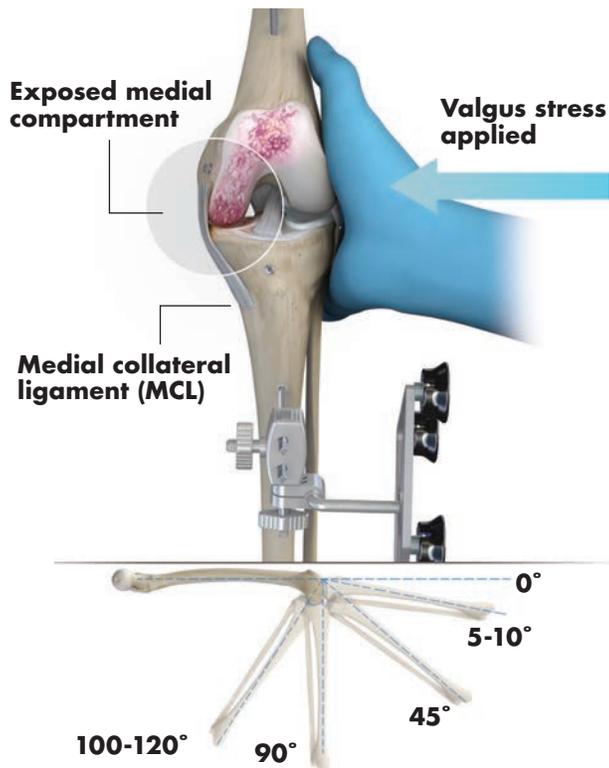


Figure 15

Remove overhanging medial osteophytes and then capture a minimum of 4 poses while applying a valgus stress to passively correct the coronal deformity. The magnitude of the valgus stress must be such that it opens up the collapsed medial compartment and tensions the medial collateral ligament (MCL) to achieve the desired degree of correction and joint stability.

**Caution must be exercised to not overcorrect the deformity.**

The poses captured are in extension, mid-flexion, flexion, and deep-flexion (or approximately 5-10°, 45°, 90°, and 100-120°).

## Fine-tune implant positioning

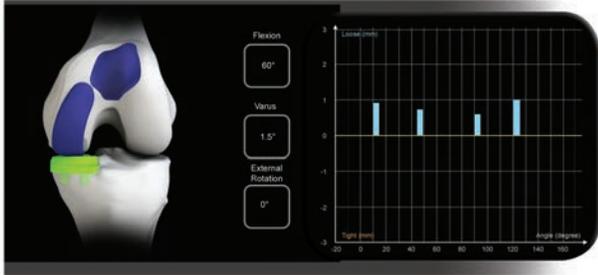


Figure 16

Map cartilage along the trochlear groove and in the distal femoral transition zones.

Fine-tune the femoral and tibial implant placement to ensure:

- Joint gaps are 0-1.5mm of looseness throughout range of motion
- Good central loading between the femoral and tibial components

Fine-tune the PF component position to ensure smooth transition from the implant to the femoral condyles and femoral component.

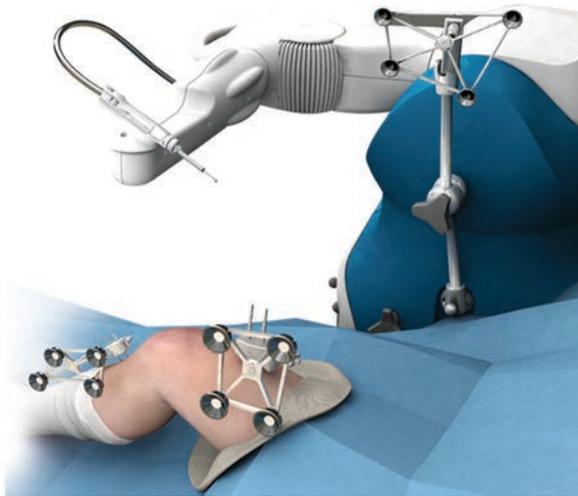


Figure 17

Position the Mako Robotic-Arm in the operative field and perform registration and verification of the robotic-arm.

## Bone resection

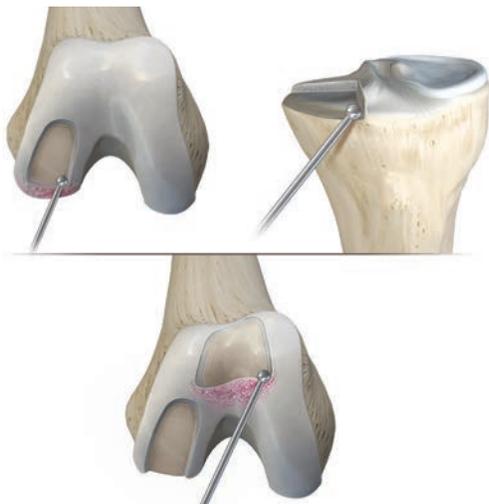


Figure 18

Resect the femoral, tibial, and trochlear surfaces and create their respective peg holes.

## Trialing, soft tissue balancing and implant insertion



**Figure 19**

Remove any meniscus and other soft tissues. Clean up the joint and install trial components. Take the limb through range of motion to assess joint stability.



**Figure 20**

Wash the joint with pulse lavage and dry before cementing the final implants. Ensure that there is good pressurization of the cement to achieve good inter-digitation. Remove all extraneous cement and then keep the joint stable until cement cures.

- Once cement cures, reassess joint stability, tibiofemoral central tracking, and range of motion.
- Remove checkpoints, bone pins, and arrays. Close the surgical wound in the normal fashion.

## Notes

## Notes

## Notes

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