ANATOMIC®

Navigated Surgical Technique
4 in 1

TO.G.GB.016/1.0

AMPLITUDE

SCREEN LAYOUT

Take screenshot

Surgical step

Dynamic navigation zone

Information area and buttons

SCREEN LAYOUT

Indicates action when yellow pedal is pushed: Return to previous step

Indicates action when blue pedal is pushed: Validate and go to next step

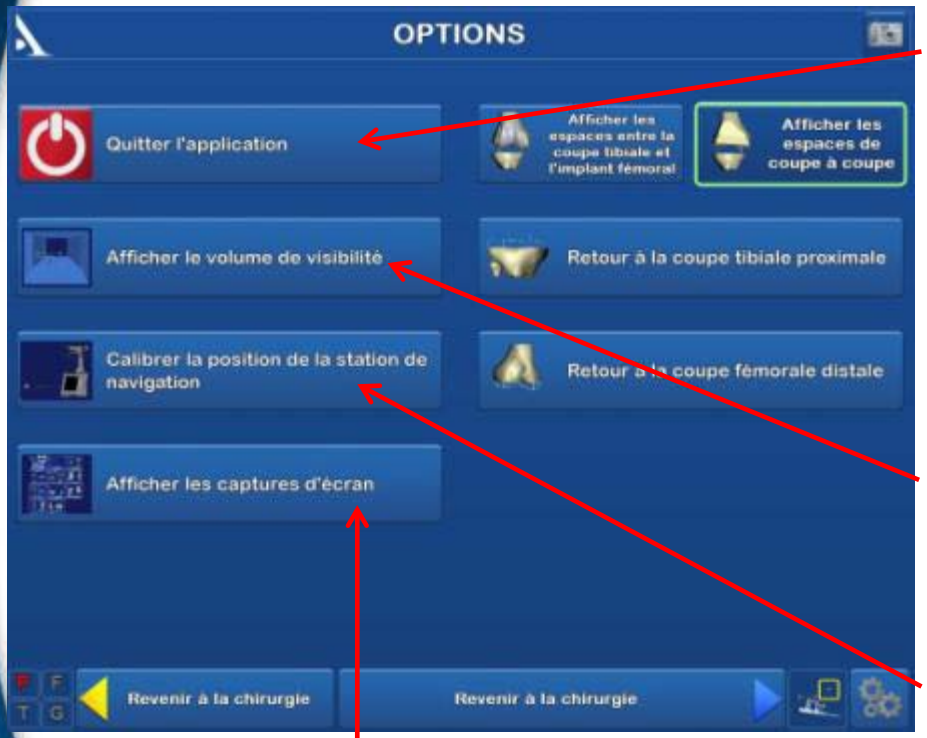
Options menu

Reference body visibility:
Green – visible
Red – non visible

Pointer can be used for screen selections

Pointer cannot be used for screen selections

OPTIONS MENU



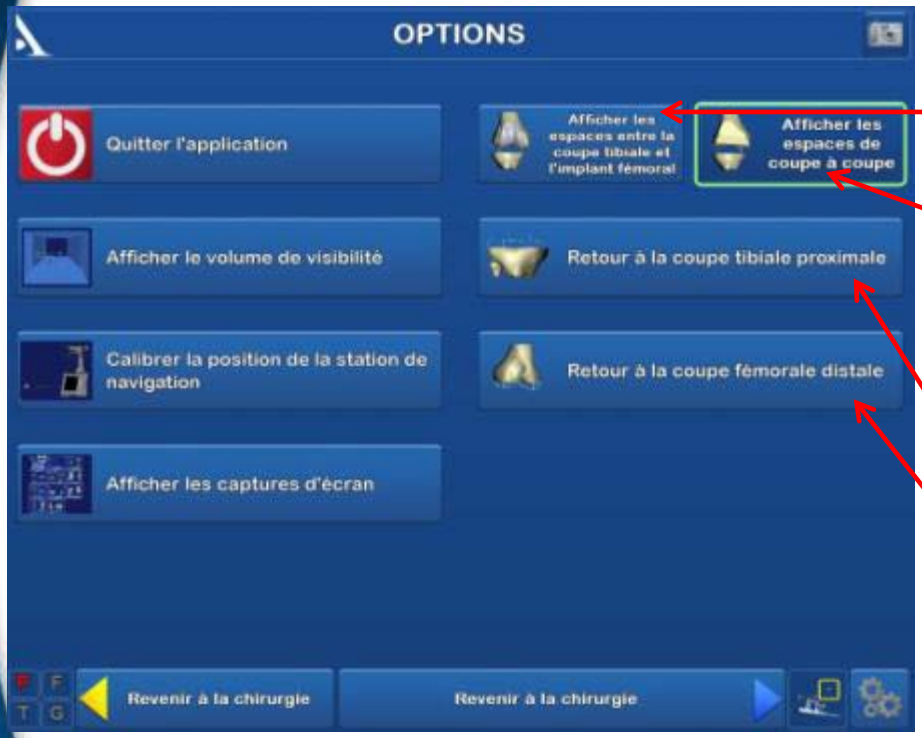
The "Exit Application" button will only be active during the final step. To exit the application before the final step, the user will have to go to the "Options" menu to select it

Show camera field of view to locate Reference bodies

Reset navigation station position relative to surgeon position

View all the validated steps during the surgery

OPTIONS MENU



During the gap balancing step, you can either:

- Display the gap between the tibial cut and virtual condyle
- Display the gap between the tibial and femoral cuts

During the gap balancing step, you can:

- Return to the proximal tibial cut navigation step
- Return to the distal femoral cut navigation step

AMPLITUDE

PARAMETERS: SURGICAL DATA

Select desired joint implant and protocol:

- 5-in-1 femoral resection technique
- 4-in-1 femoral resection technique

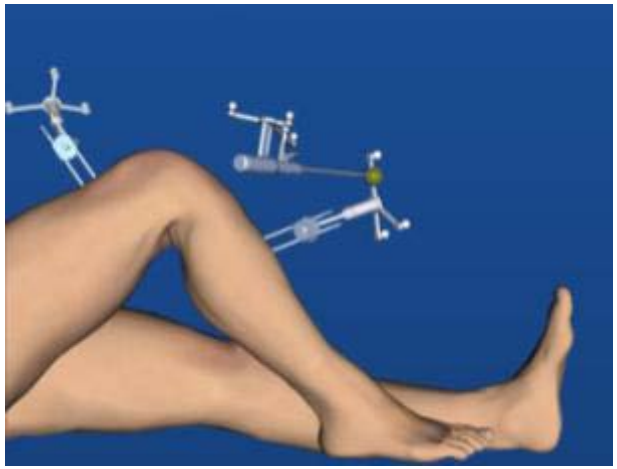
Enter patient-related information

PARAMETERS: SURGICAL DATA

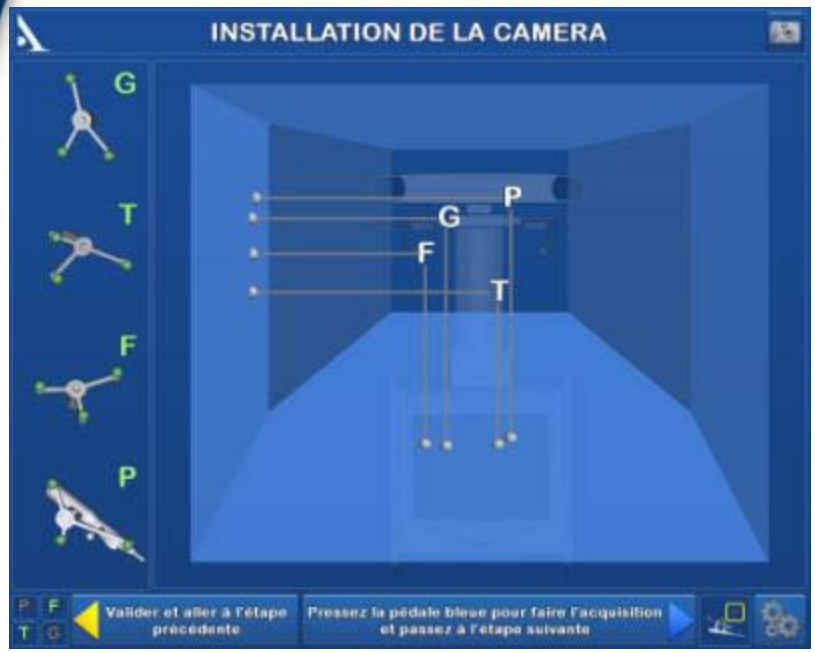
Select surgical protocol parameters:

- Same order as distal femoral and tibial cuts are performed
- Trial implants acquisition order

Set up reference bodies



STATION INSTALLATION & SCREEN CALIBRATION

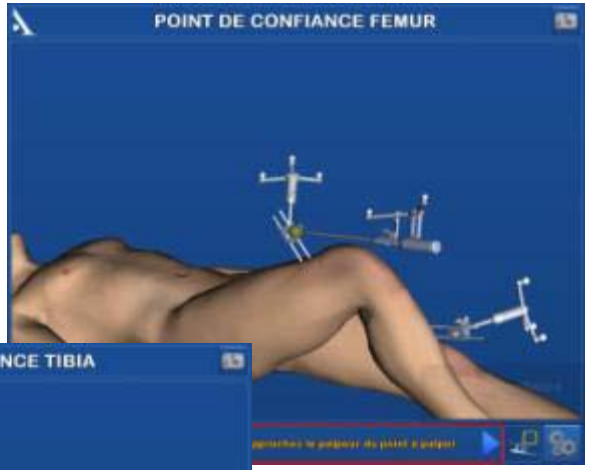


Position the infra-red camera so that the letters identifying the F and T reference bodies are in the centre of the field of view

Direct the pointer to the centre of the screen. Press the trigger to validate

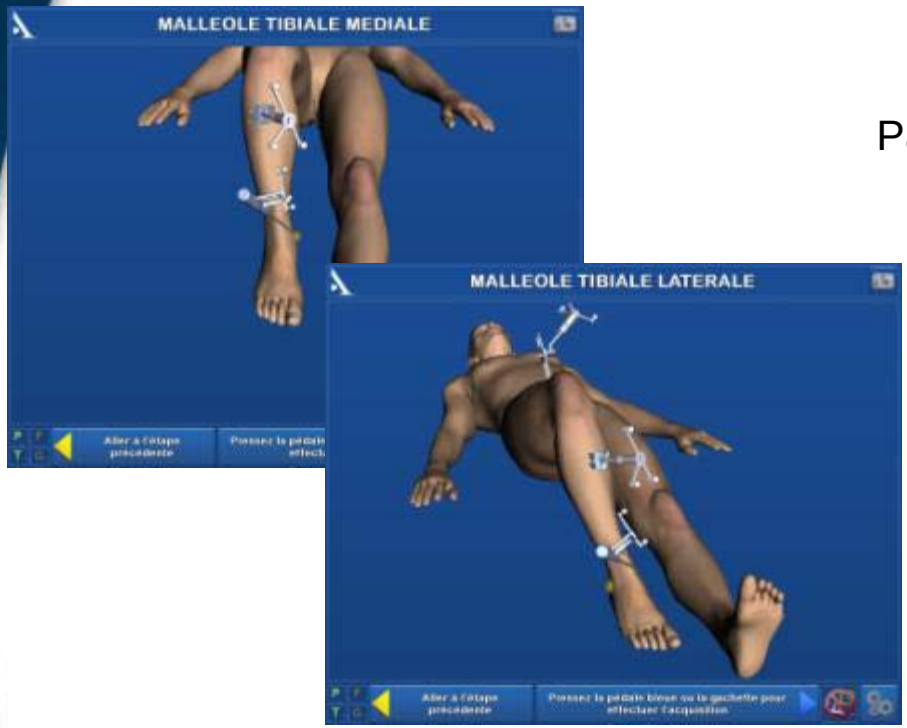
CALIBRATION POINTER AND REFERENCE BODIES

Calibrate the pointer



Place the pointer's tip in the calibration cone on the reference bodies and validate

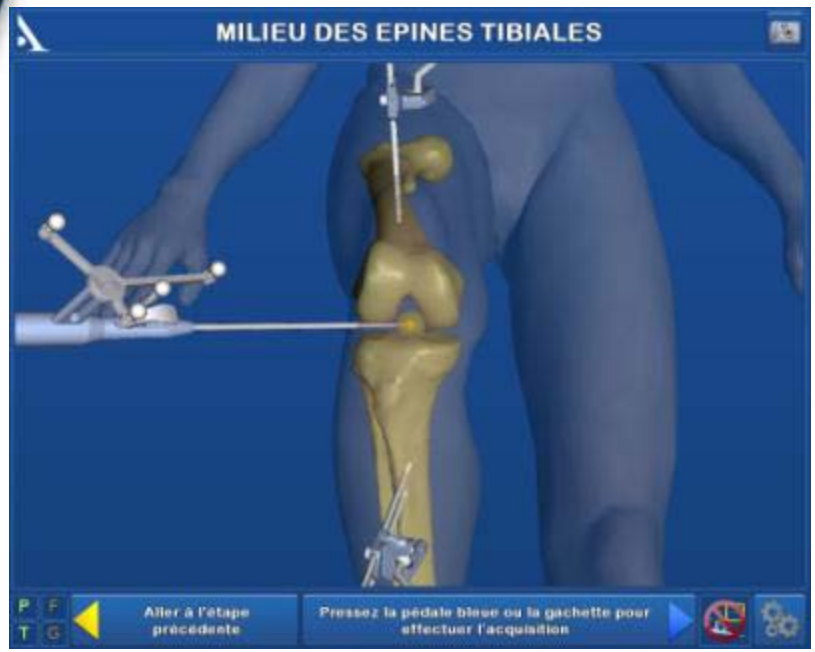
ACQUISITION OF ANATOMICAL POINTS



Palpate the medial and lateral malleoli

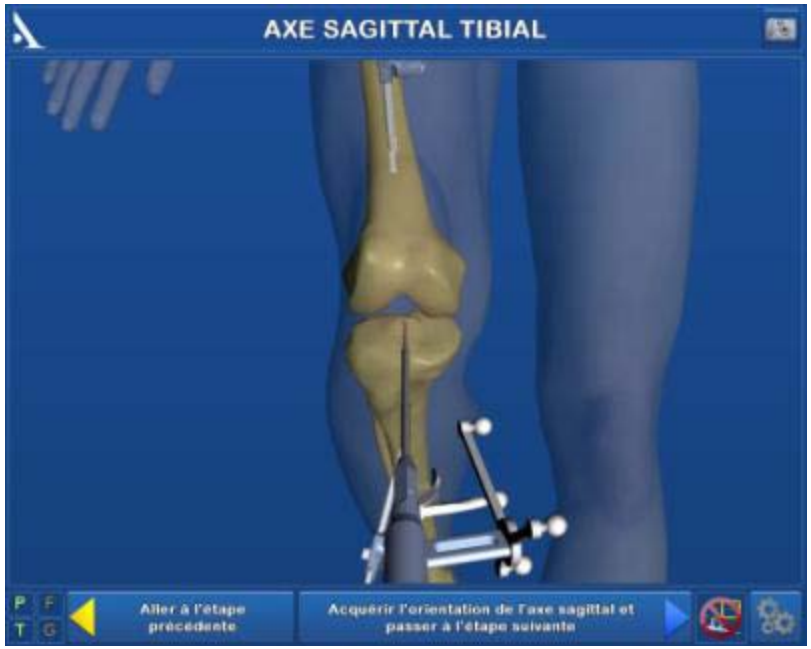
With the leg extended, hold the patient's heel for the acquisition:
Draw a circle with the leg
(15 cm radius of the knee)to acquire the hip centre

TIBIAL ACQUISITION



Palpate the intercondylar eminence

Define the sagittal plane orientation:
- Place the pointer on the intercondylar eminence and align the probe's body
- Once it corresponds to the desired sagittal plane orientation, confirm its position



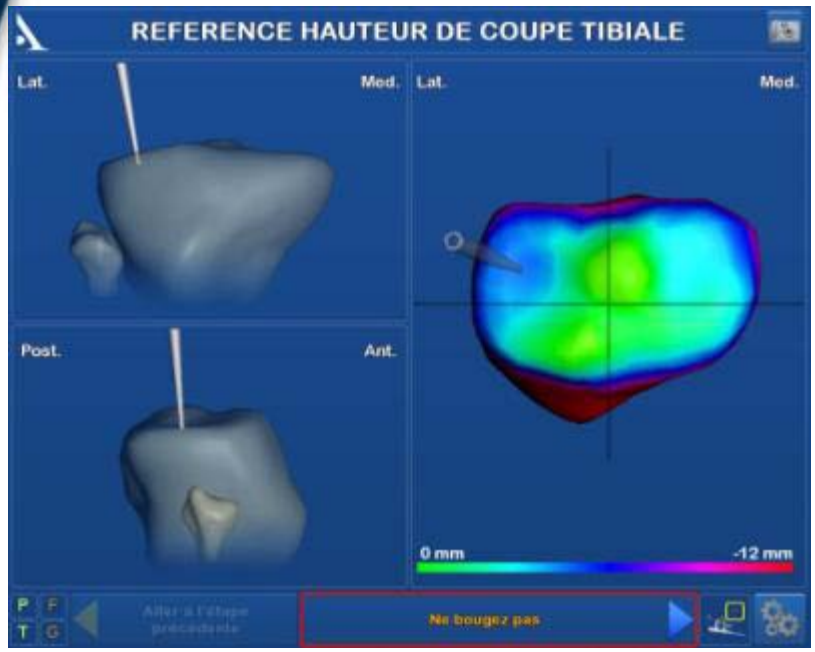
AMPLITUDE

TIBIAL DIGITIZATION

Slide the pointer against both articular facets and the anterior, medial and lateral edges. This will result in a representation of the actual bone surface of the tibial plateau

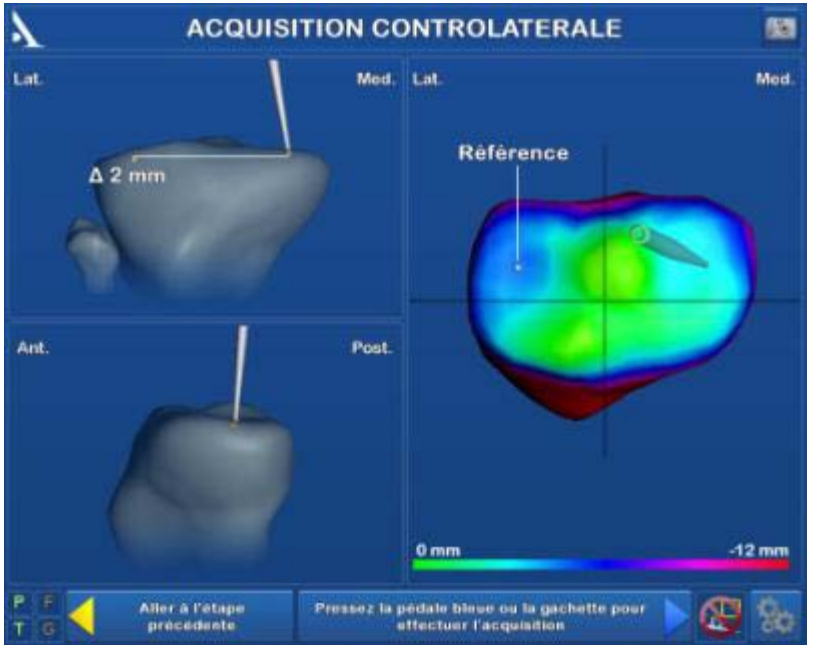
Note: At least 2 green cubes
and 50 points must be captured before going to the next step

TIBIAL RESECTION HEIGHT REFERENCE

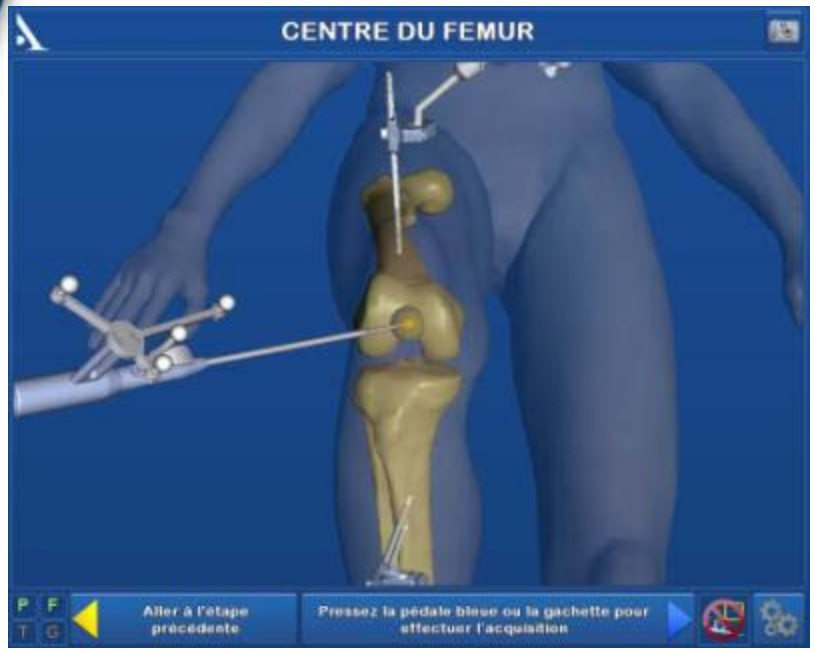


Select and acquire the reference point that will be used to define the resection height.
A colour heat map shows the contours of the articular surfaces

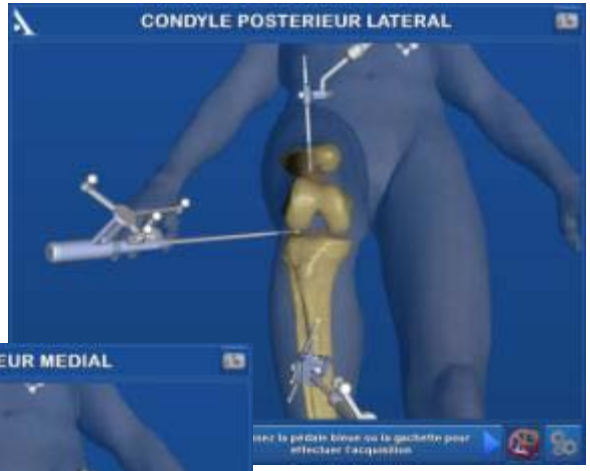
Select and acquire a contralateral point that will be used to measure the distance relative to the reference point for the resection height

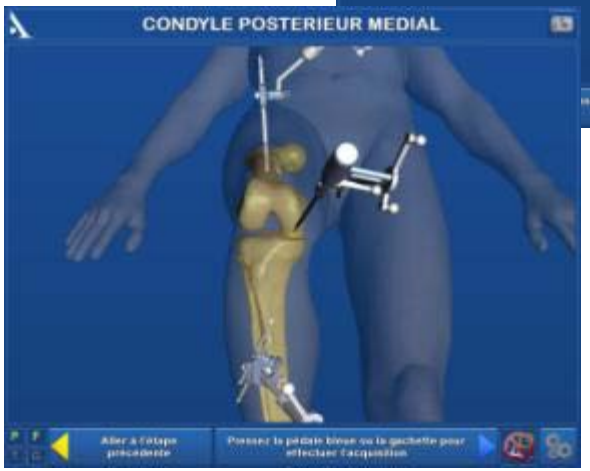


FEMORAL ACQUISITION



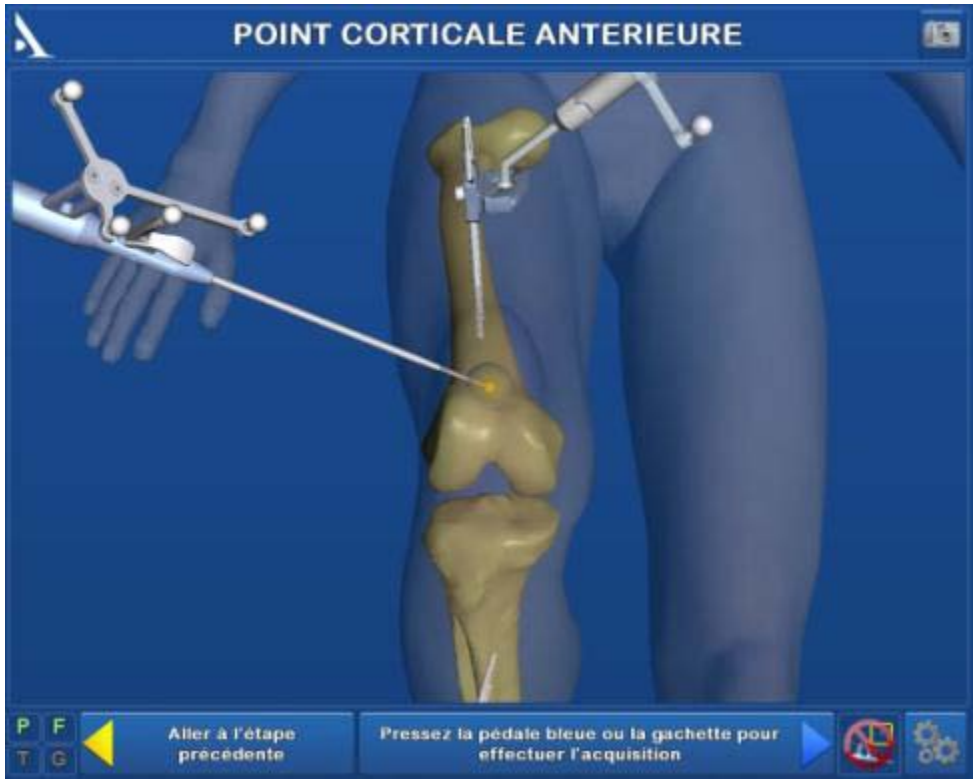
Place the pointer’s tip at the centre of the trochlear sulcus and validate





Palpate the most posterior point of the medial and lateral condyles. The goal is to define the orientation of the femur's frontal plane.

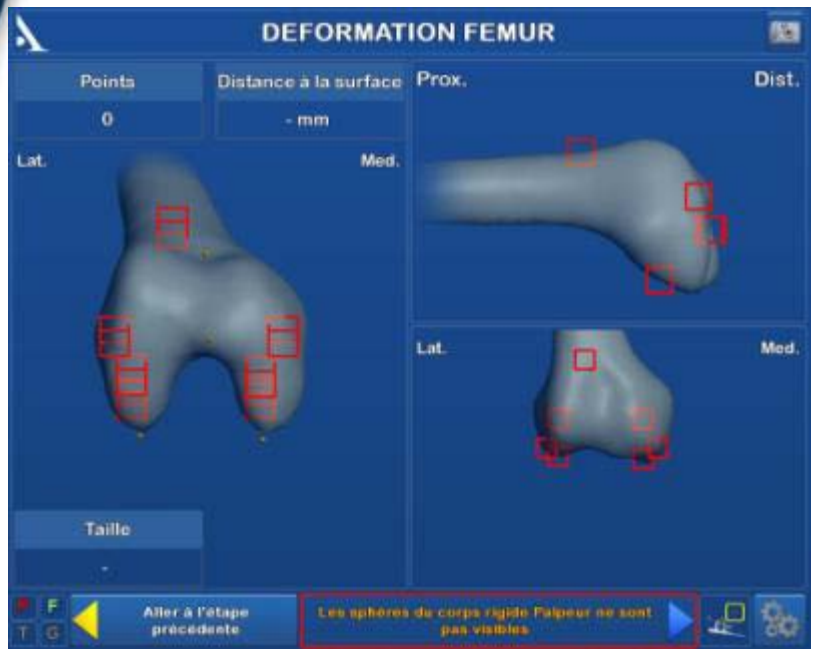
FEMORAL ACQUISITION



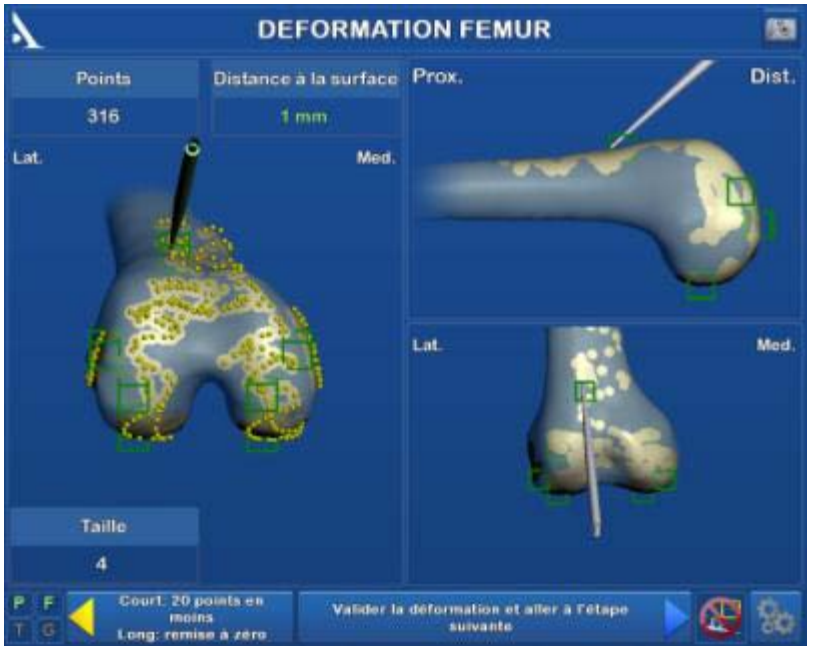
Palpate a point on the anterior cortex

AMPLITUDE

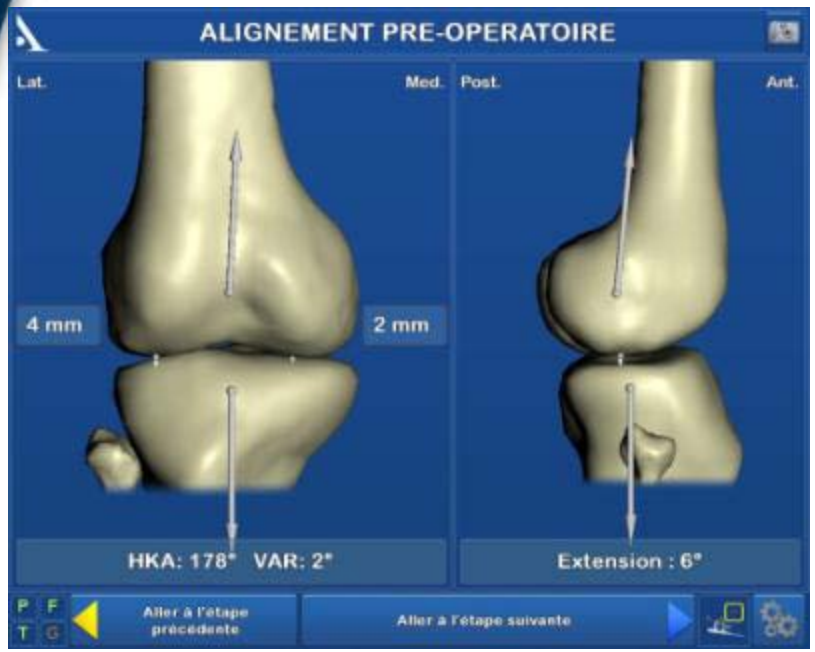
FEMUR DIGITIZATION



Acquire points over the ENTIRE joint surface and make sure that every cube is green (validated area)

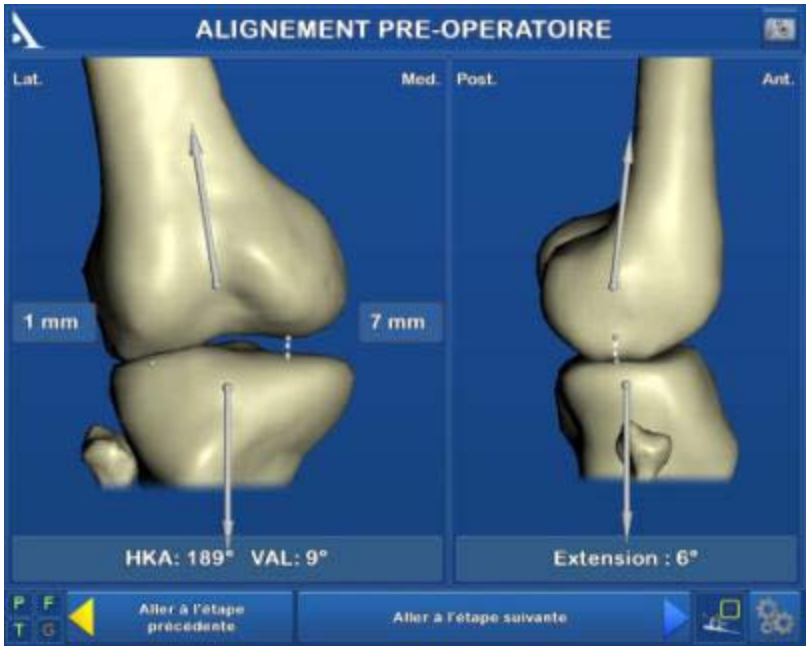


ACQUISITION OF PRE-OPERATIVE HKA ANGLE

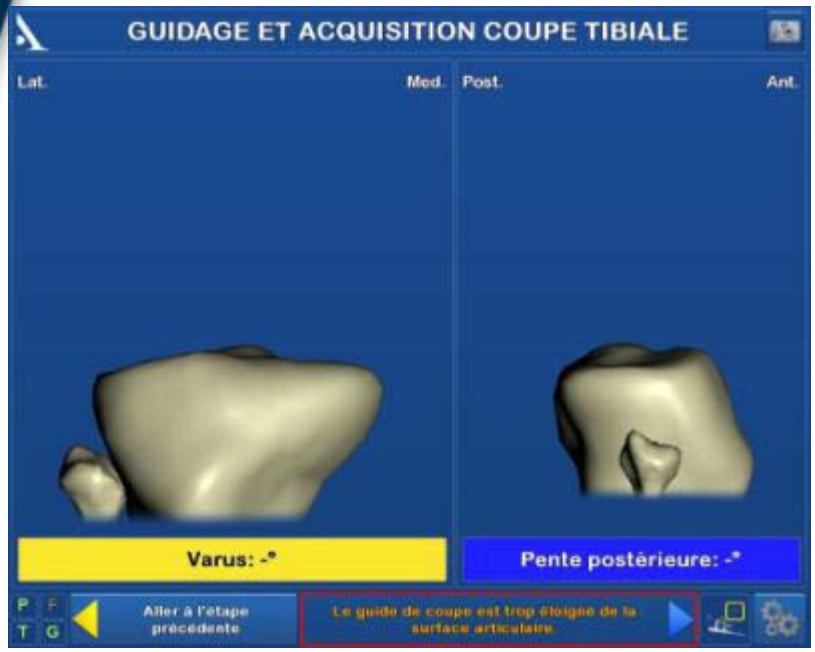


Fully extend leg to obtain preoperative deformity information

Initial evaluation of joint laxity: points palpated on tibial joint surfaces are projected onto femur



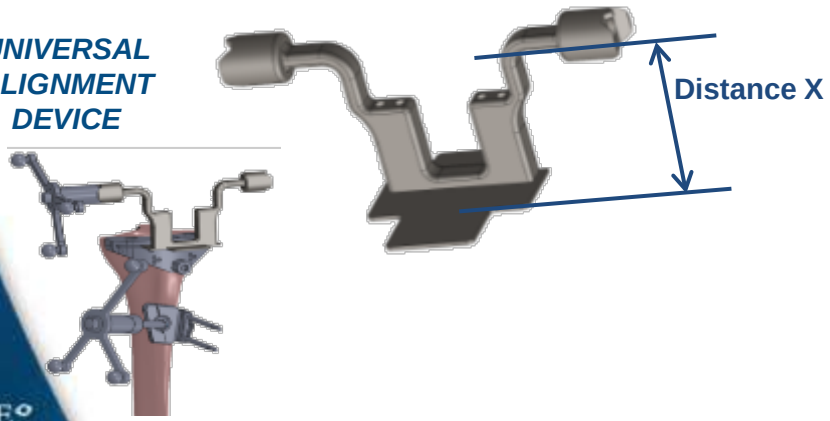
GUIDING AND NAVIGATION OF TIBIAL CUT



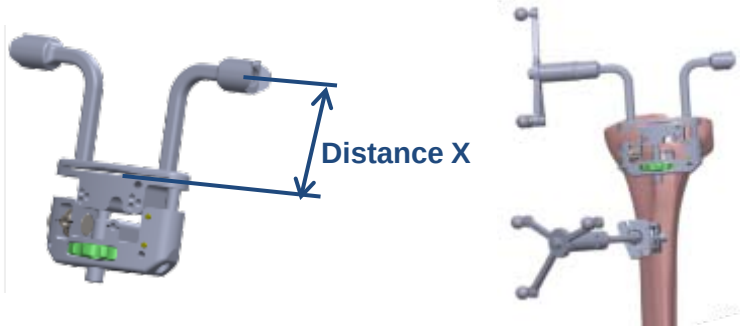
Dual function step:
- navigate tibal cut plane
- acquire performed cut

Design of universal instrumentation

UNIVERSAL ALIGNMENT DEVICE



SEMI-ASSISTED RESECTION GUIDE

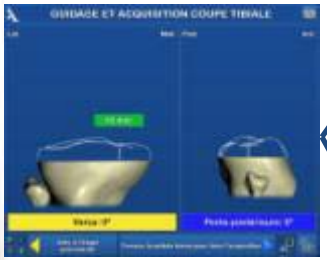


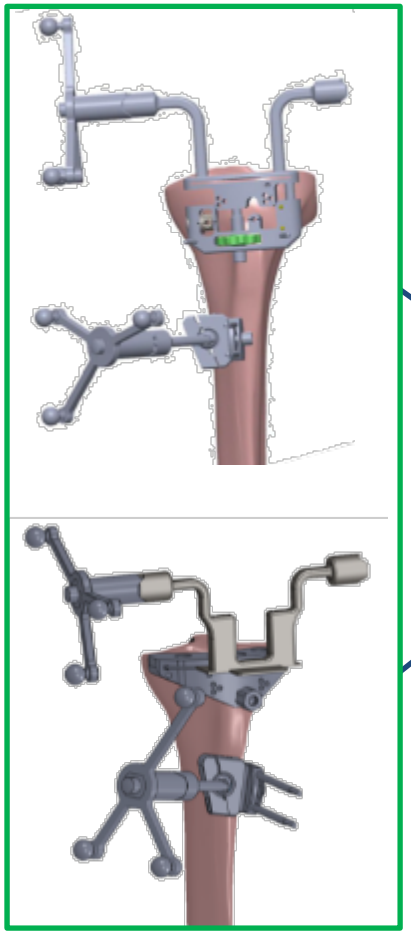
GUIDING AND NAVIGATION OF TIBIAL CUT

NAVIGATION OF TIBIAL CUT

Free-hand instrumentation with either:
- Universal alignment device
- Semi-assisted resection guide

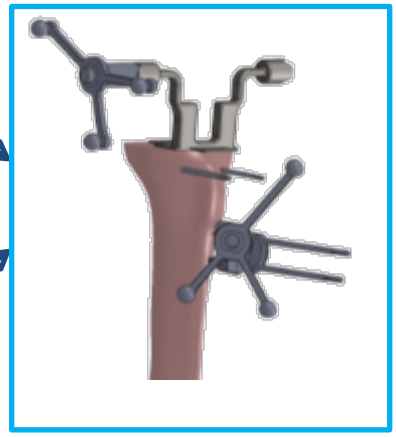
Semi-assisted resection guide



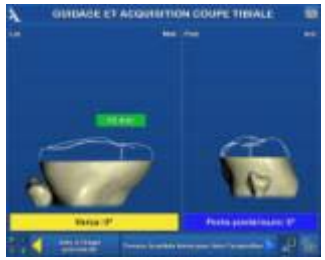


Universal alignment device

CUT ACQUISITION STEP



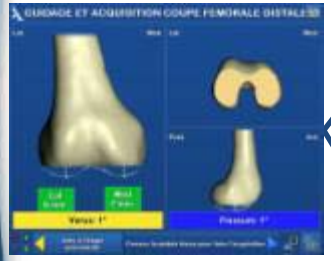
Universal alignment device

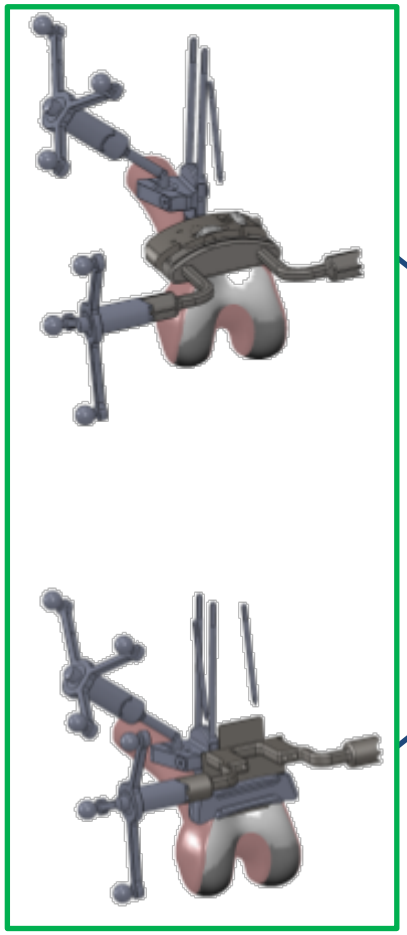


GUIDING AND NAVIGATION OF DISTAL CUT

NAVIGATION OF TIBIAL CUT

Semi-assisted resection guide

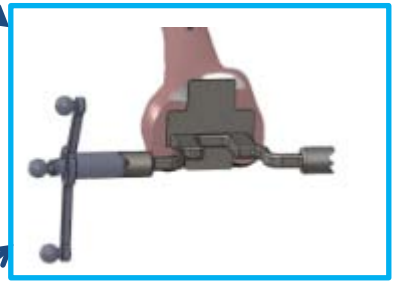




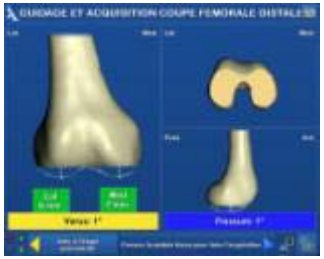
Universal alignment device

Dual function step:
- navigate distal cut plane
- acquire performed cut

CUT ACQUISITION STEP



Universal alignment device



GAP BALANCING

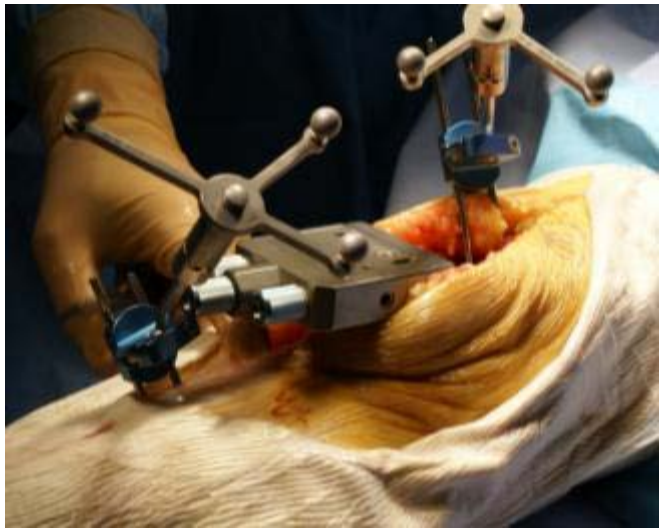
Extend knee, put tension on ligaments and look at:

- Medial and lateral gap between tibial cut and virtual femoral condyle
- Ligament-based HKA
- Bone-based HKA

MAKE SURE KNEE IS EXTENDED → TIBIAL CUT PARALLEL TO DISTAL CUT

Once the gap is balanced, press on the blue pedal to record the gap value

Note: Soft tissues can be released if needed to balance out the gap



GAP BALANCING

DIFFERENCE BETWEEN LIGAMENT-BASED HKA AND BONE-BASED HKA:

- The **Ligament-based HKA** takes into account the laxity of the medial and lateral collateral ligaments. The value given corresponds to that obtained if tension was placed on the ligaments by placing the cuts into contact.

- The **Bone-based HKA** ONLY takes into account the orientation of the distal femoral and tibial cuts. The value given corresponds to that obtained if the cuts were in contact.

GAP BALANCING

With the knee flexed, place tension on the ligaments and evaluate the gap between the **tibial cut** and the **virtual femoral component**

Adjust the various parameters to move the virtual condyle until the desired gap is achieved. Check:

- Thickness of posterior cuts
- Anterior cut
- Trochlea position

GAP BALANCING

Press the  button to directly transfer the gaps measured on the extended knee to a flexed knee.

The AMPLIVISION® navigation system will automatically set the femoral component position to reproduce the gap measured with the knee extended.

However, each parameter can still be modified as needed.

GAP BALANCING

In the "Options" menu, you can view the gaps without the virtual femoral component. In this case, the gaps correspond to the space between the tibial and femoral cuts.

GUIDING WITH 4-IN-1 RESECTION GUIDE

Place the universal alignment device into the anterior slot of the 4-in-1 guide, while holding it against the distal femoral cut.

Position the 4-in-1 resection guide according to the following predetermined parameters:

- Planned femur size
- Anterior-posterior position
- Femoral rotation

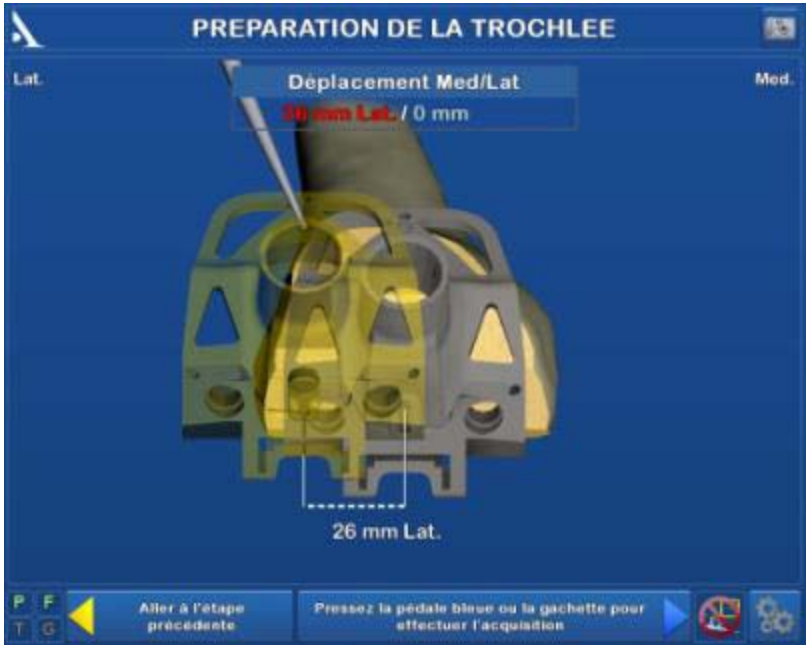
During this step, the position of the component can be evaluated relative to the anterior cut based on the chosen size (right side of screen).

Attach the resection guide and perform the femoral cuts. Press the blue pedal to go to the next step.

TROCHLEAR GROOVE PREPARATION

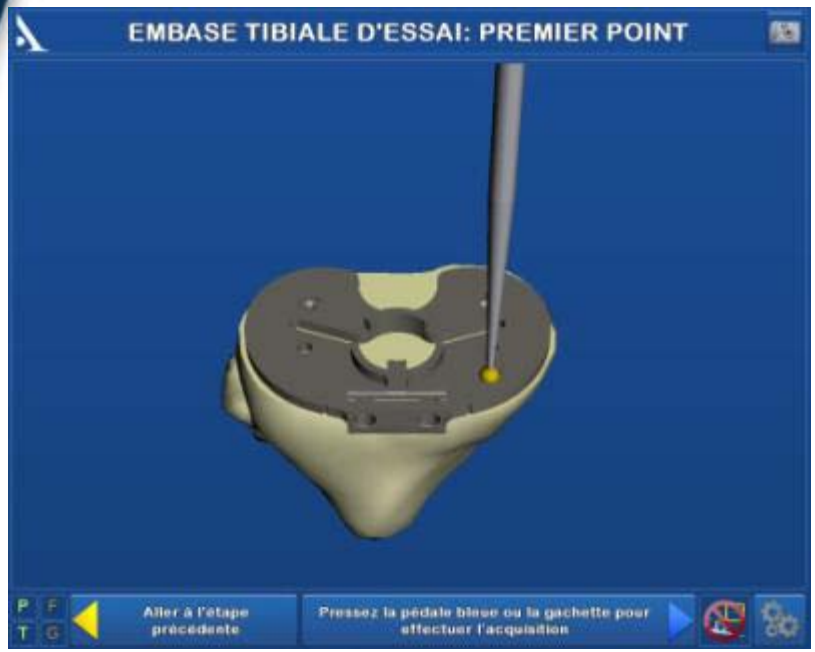
Install the trochlear groove preparation guide

Evaluate the mediolateral distance between the planned position and the real position of the trial femoral component by placing the pointer in the calibration hole on the anterior surface



Fix the trochlear groove preparation guide.
Validate its position through acquisition of calibration cone.
Prepare the trochlear groove.

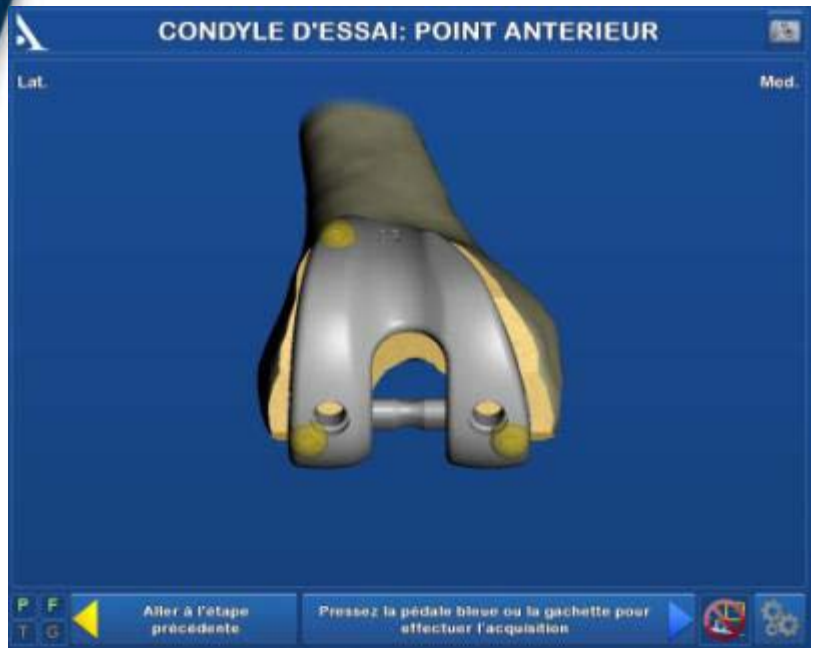
TRIAL IMPLANTS: TIBIA



Select a tibial baseplate size and attach a trial baseplate.
Using the probe/pointer, acquire 3 calibration cones located on the baseplate to detemine its position on the tibia.

Information on the baseplate position and the cut are displayed

TRIAL IMPLANTS: FEMUR

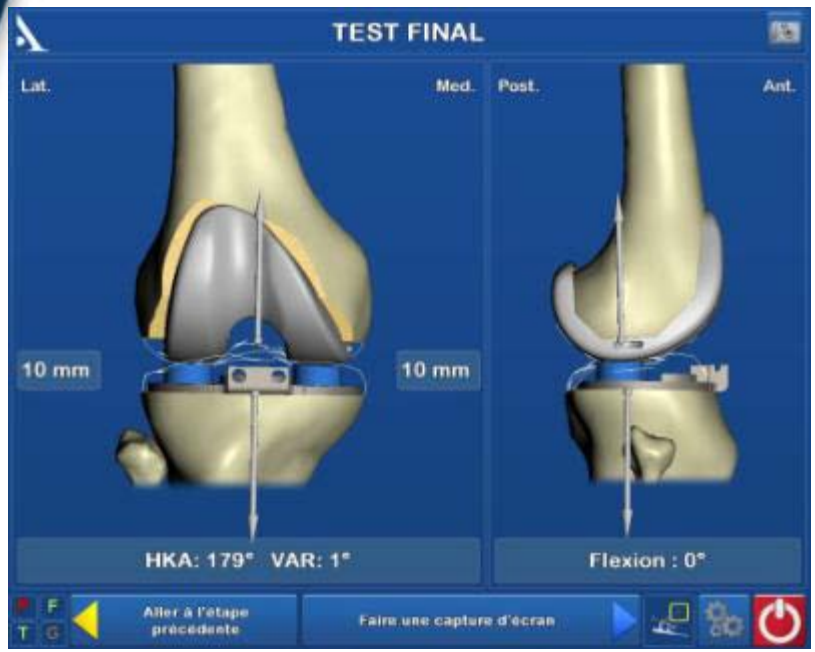


Install the trial femoral component

Palpate the 3 calibration cones

- Comparison between planned values (in blue) and final values (in white)
- Information on femoral component position according to the resection parameters planned and adjusted by the surgeon

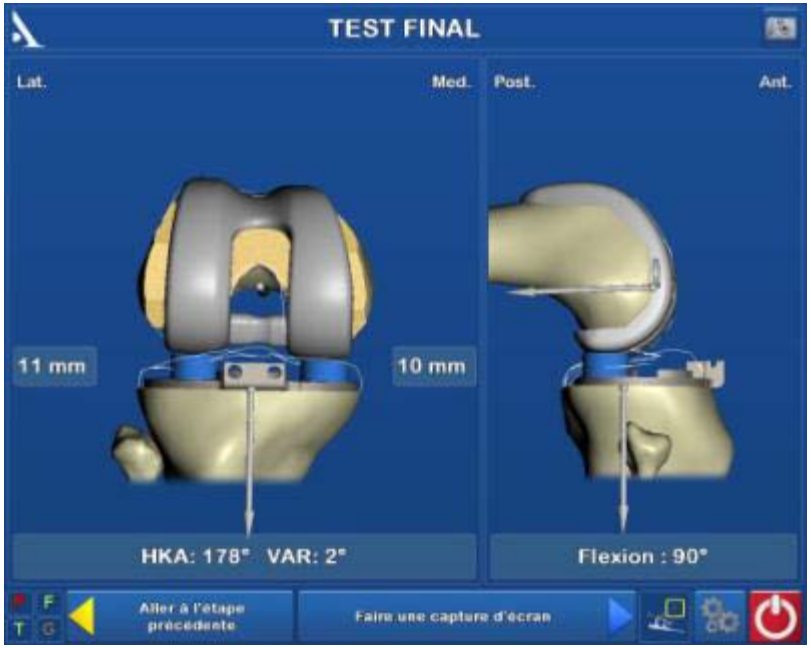
POST-OPERATIVE VALIDATION



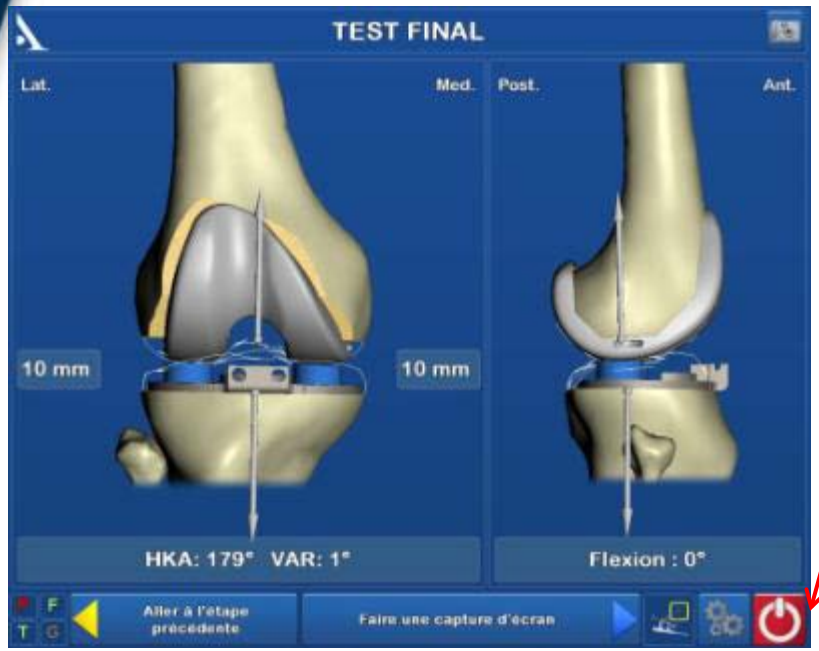
View final HKA angle and evaluate joint laxity

Test joint mobility and stability at various flexion angles and save screenshots by pressing on the blue pedal or on the "camera" button in the upper right corner of the screen

Finish preparing the tibia and the patella. Then, perform the final implant placement

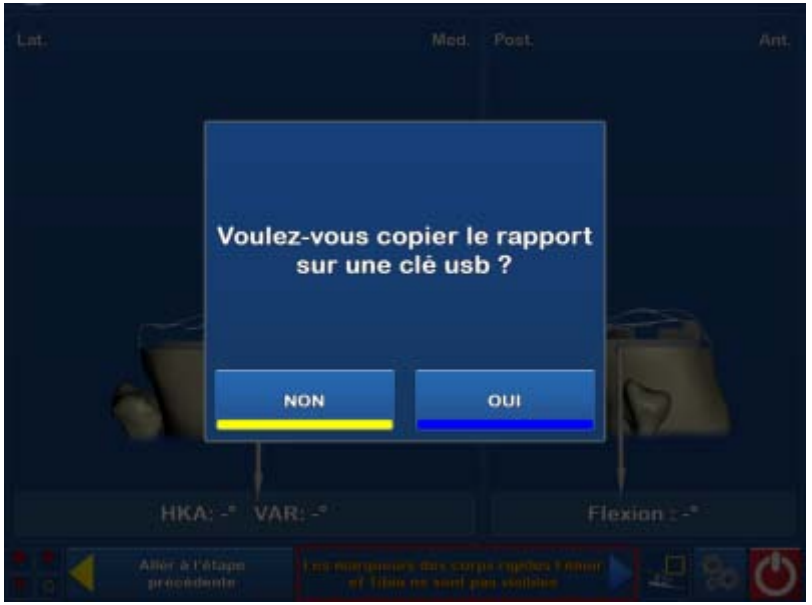


FILE SAVING



Press the "Exit Application" button in the lower right corner of the screen

Insert a USB flash drive, then select "Yes" to save the report onto it



CONCLUSION

- Surgeon chooses the surgical protocol
- The ability to view the tibial and distal femoral cuts before validation provides an opportunity to quickly and easily compensate for any buckling of the saw blade.
- During each step, the least amount of information necessary is shown to make sure the system is as easy to use as possible

AMPLITUDE