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SHARING EXPERTISE

ORTHOPAEDIC
SURGERY

AESCULAP® OrthoPilot®

OrthoPilot® KNEESUITE – VERSION 6
NAVIGATED SURGICAL TECHNIQUE

AESCULAP® OrthoPilot® TKA

OrthoPilot® TKA – TOTAL KNEE ARTHROPLASTY

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OrthoPilot®

OrthoPilot® helps with precise implantation of knee and hip endoprostheses (1). Significant criteria when developing the OrthoPilot® included integration into surgical procedure and operation times (2). Another central consideration for us was gentle, patient-friendly navigation: from the very beginning, our goal was to develop a method that did not require expensive and stressful CT/MRI scans, and that kept operation times as short as possible.

- CT-free
- Ergonomic instruments adapted to the procedure
- User-friendly navigation system integrates easily into operation
- Intraoperative documentation with OrthoPilot®
- Numerous international studies confirm precise implant alignment (3-6)
- Routinely used in more than 600 hospitals
- Over 300 OrthoPilot® publications around the world (7, 8)

AESCULAP® OrthoPilot® TKA

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AESCULAP® OrthoPilot® TKA

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Drill sleeve	NP616R
Screw length measuring device	NP281R

TISSUE PROTECTION SLEEVE, BICORTICAL SCREWS, RIGID BODY (RB)

MIOS® tissue protection sleeve	NQ941R
Bicortical screws	NP620R - NP625R
Rigid Body	NP619R

PASSIVE TRANSMITTER

Yellow	FS633
Blue	FS634
Red	FS635

TWO-PIN TRANSMITTER FIXATION

Two-pin transmitter fixation element	NP1016R**
Pin for two-pin transmitter fixation, D= 3.2, short	NP1012R**
Pin for two-pin transmitter fixation, D= 3.2, long	NP1013R**

TIBIA CHECK PLATE

Tibia check plate	NP617R
Tibia check plate, modified	NP617RM

SPREADER AND SPREADING PLIERS

Spreader	NE750R
Spreading pliers	NP609R
Alternative: Power-controlled spreading pliers	NP605R

TIBIAL ROTATION NAVIGATION ADAPTER

Tibial rotation navigation adapter	NP1017R**

POINTER, STRAIGHT

Pointer, straight	FS604

**** NOTE**
Only available in NP1000/NP1002

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1 | OVERVIEW OF INSTRUMENTS: STANDARD AND MIOS® INSTRUMENTS*

FEMORAL ALIGNMENT BLOCK WITH FOOT PLATES

e.motion®	NE440R
e.motion® MIOS®	NQ955R
e.motion® MIOS® short	NQ945R
Columbus®	NE324T
Columbus® MIOS®	NQ954R
Columbus® MIOS® short	NQ944R
Y foot plate	NQ956R
Foot plate left	NE441RM
Foot plate right	NE442RM

TIBIA CUTTING BLOCK

Standard right	NP596R
Standard left	NP597R
MIOS® right	NQ952R
MIOS® left	NQ951R

DISTAL FEMORAL CUTTING BLOCK

Standard	NP598R
MIOS®	NQ953R

*** NOTE**

not for VEGA System®

FEMORAL ALIGNMENT BLOCK WITH FOOT PLATES

Femoral alignment block	NS320R
Y foot plate	NQ958R

TIBIAL/DISTAL FEMORAL CUTTING BLOCK AND RB ADAPTER, MODULAR

Tibial/distal femoral sawing guide	NS334R
Tibial sawing guide, asymm. left-medial	NS406R
Tibial sawing guide, asymm. right-medial	NS407R
RB adapter, modular	FS626R

4-IN-1 FEMORAL CUTTING BLOCK AND RB ADAPTER, MODULAR

e.motion® F2 - F8	NS582R - NS588R
VEGA System® F1 - F8	NS321R - NS328R
Columbus® F1 - F8	NQ1041R - NQ1048R
RB adapter, modular	FS626R

IQ ALIGNMENT INSTRUMENT FOR FEMUR/TIBIA CUTTING BLOCK

IQ Alignment instrument for femur/tibia cutting block	NP1018R**

**** NOTE**
Only available in NP1000/NP1002

AESCULAP® OrthoPilot® TKA

1 | OVERVIEW OF INSTRUMENTS

MULTITOOL

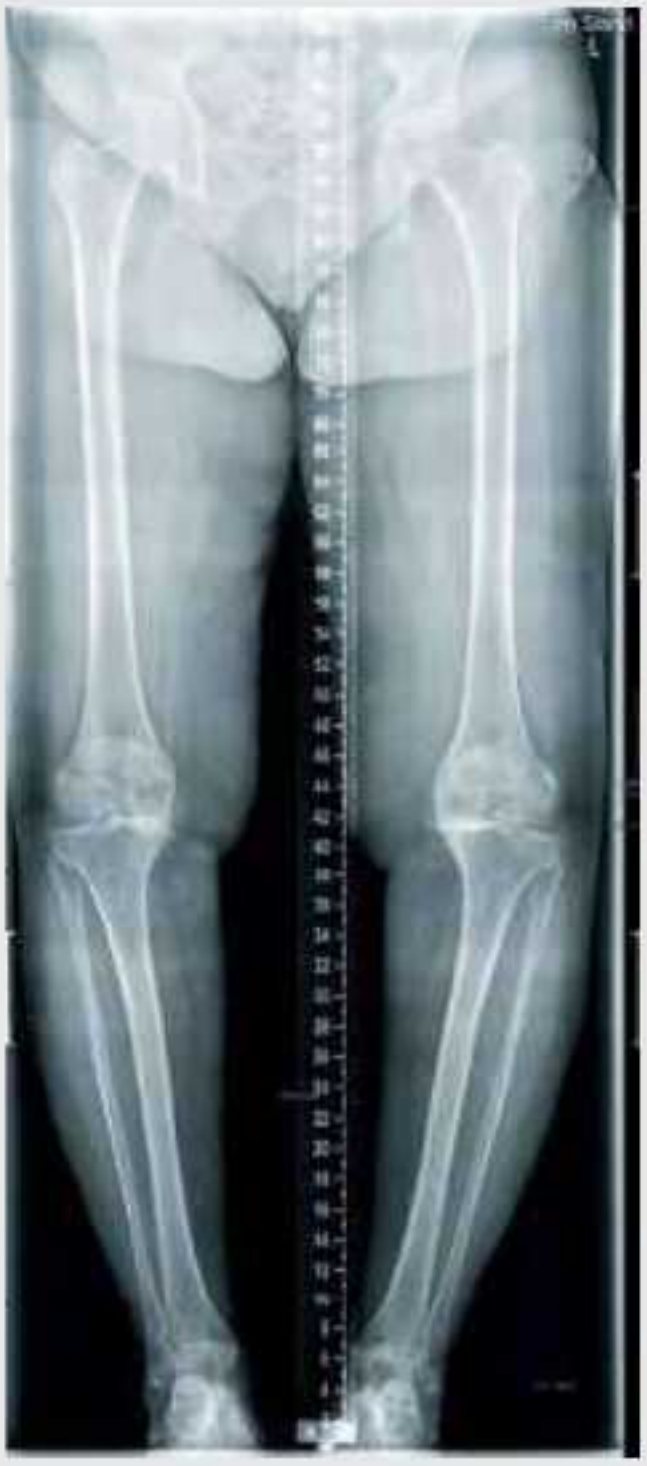
Multitool	FS640**

PASSIVE CLICK TRANSMITTER, YELLOW

Passive click transmitter, yellow	FS636**

** **NOTE**
Only available in NP1000/NP1002

2 | PRE-OPERATIVE PLANNING USING RADIOGRAPHIC IMAGES



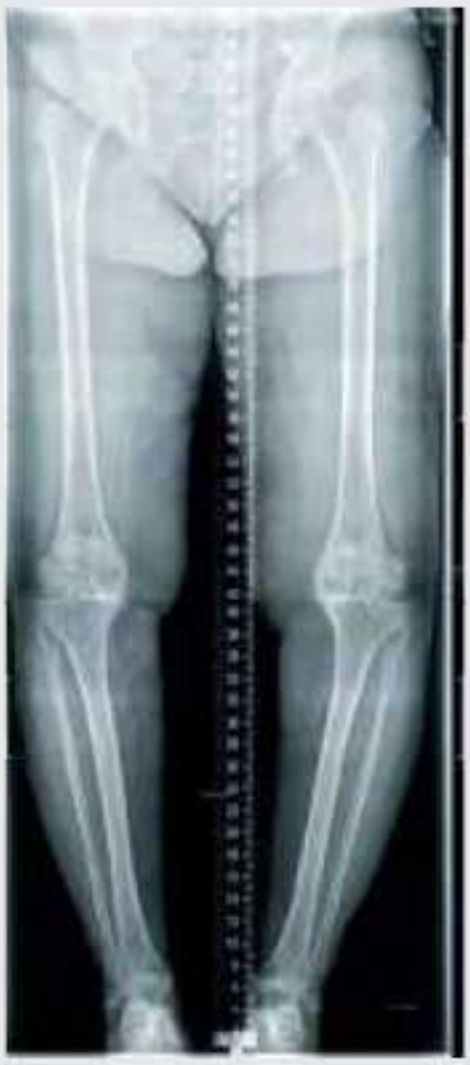
The OrthoPilot® system and the TKA software can be used in any cases for which knee endoprostheses are indicated as primary therapy, provided that the patient has sufficient bone quality and hip joint mobility.

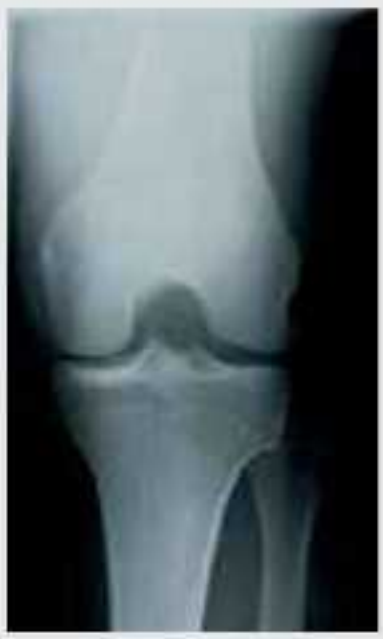
NOTE

Be sure to follow the instructions in the corresponding surgical technique manuals, instructions for use, and package inserts, especially the instructions for use for the OrthoPilot® application software TKA TA015239.
During surgery, users should check all data for plausibility using the known possibilities as for example plausibility checks to the X-ray images and check of the instruments used. In addition instruments are available, e.g. like the angel-wing or rods for axis verification of the cut.

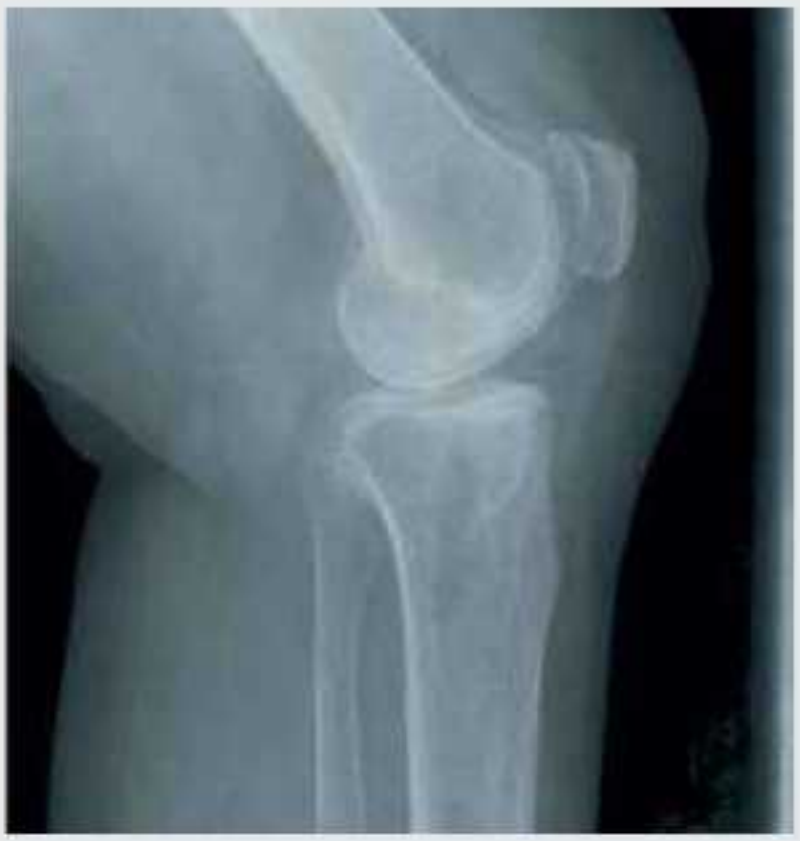
AESCULAP® OrthoPilot® TKA

2 | PREOPERATIVE PLANNING USING RADIOGRAPHIC IMAGES





AESCULAP® considers it necessary to conduct sufficient pre-operative planning on the basis of the following radiographic images:	Selected information that may be obtainable from radiographic images:
▪ Full-leg still image	▪ Axis misalignment
▪ Knee joint in A/P projection	▪ Implant alignment, joint gap, implant size ML
▪ Knee joint, lateral projection	▪ Slope, implant size A/P
▪ Patella – tangential image	▪ Patella shape, joint gap



Analyzing whether a total knee endoprosthesis is necessary is an essential part of pre-operative planning. In addition to standard radiographic examinations, the surgeon should consider the following factors before performing a total knee endoprosthesis:

- Soft tissue situation
- Extensor mechanism functionality
- Bone conservation
- Restoration of proper axis alignment
- Functional stability
- Restoration of the joint line

The AESCULAP® Columbus®, e.motion®, e.motion® Pro System and VEGA System® radiographic templates can provide the following information when analyzing radiographic images:

- Angle between anatomical and mechanical femoral axis
- Resection levels
- Implant sizes

AESCULAP® OrthoPilot® TKA

3 | PATIENT PREPARATION / POSITIONING

4 | OrthoPilot® SET-UP AND TRANSMITTER POSITION

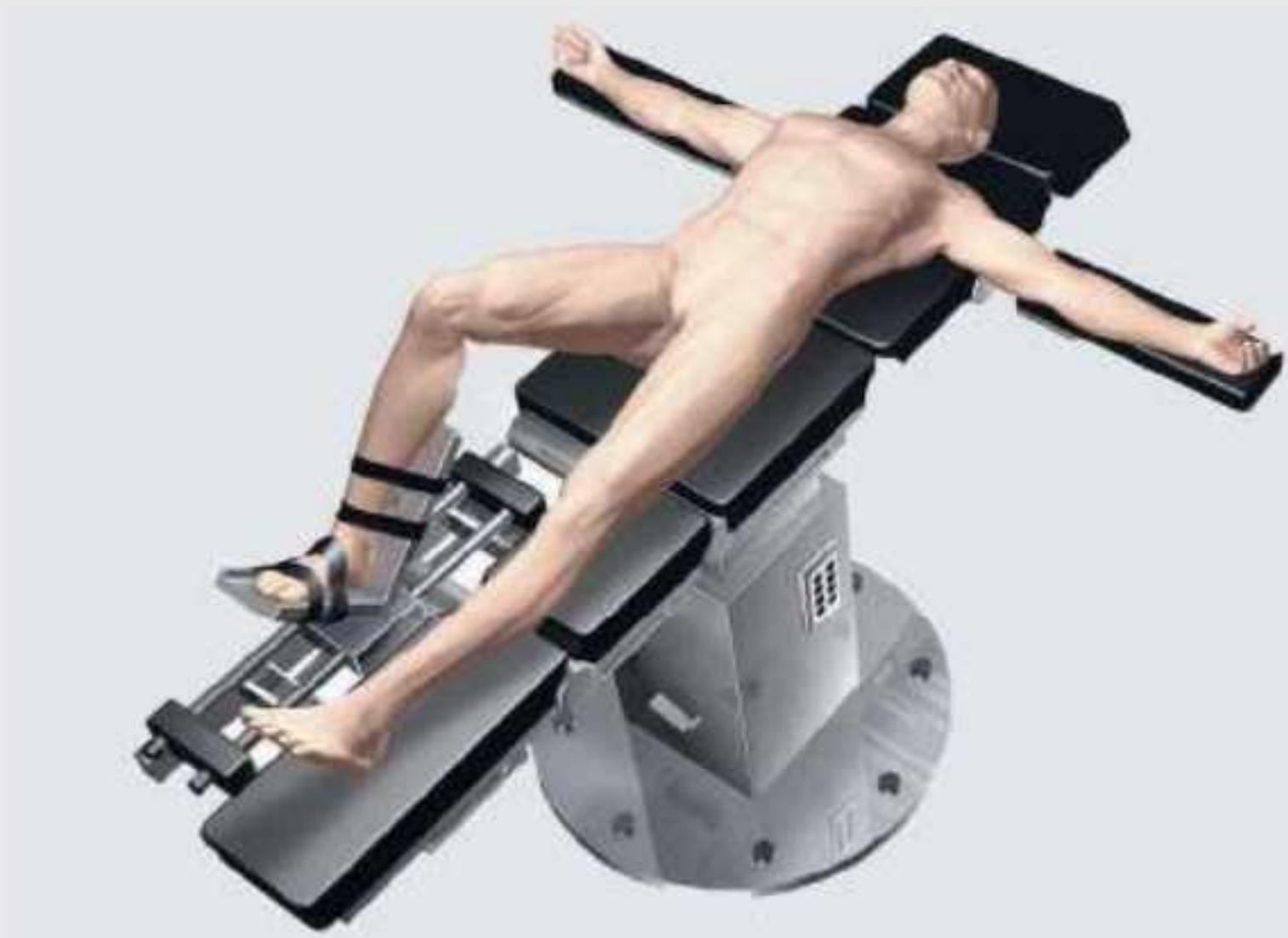


Fig. 1

Positioning and sterile covering of the patient are to be done in accordance with the standard procedures used with conventional surgical techniques.
AESCULAP® recommends using a leg holder to help adjust the patient's leg during different phases of the operation. The leg will need to be repositioned several times while recording the registration points and performing bone cuts. The leg holder allows users complete flexibility in knee positioning, from full flexion to full extension.

NOTE
To facilitate quadriceps mobilization, place the knee at a 100° bend before activating the blood arrest. If using a cushion, make sure it does not hinder the hip movement required in order to register the center of the femoral head.

4.1 OrthoPilot® positioning

When positioning the OrthoPilot®, make sure that the surgeon will have a clear view of the screen at all times. The device and/or the camera can be positioned either on the opposite side of the operated leg (contralateral) or on the same side (ipsilateral). The mean distance to the transmitters should be around 2 m (for the FS101) or 2.5 m (for the OrthoPilot® *Elite*). Enter the chosen position (ipsi-

or contralateral) at the "Surgery Data" step of the OrthoPilot® set-up screen. Positioning the camera at shoulder level on the patient's opposite side, tilted around 45° to the operating area, has often proven highly effective.

Fig. 2

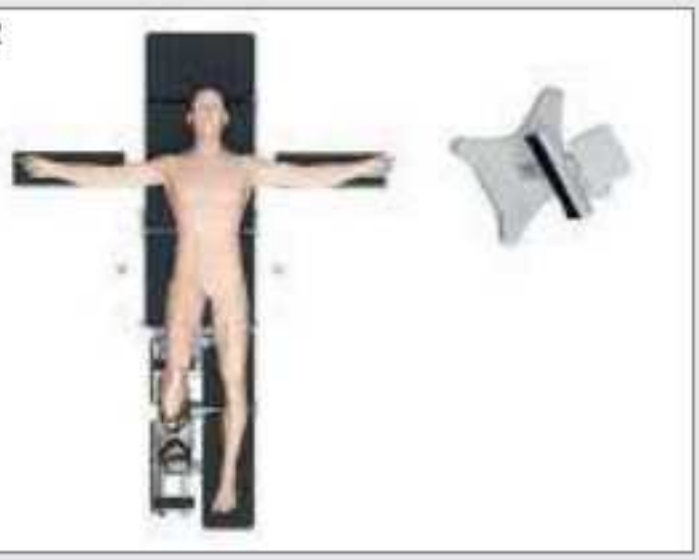


Fig. 3a

Fig. 3b

4.2 Femoral transmitter

General instructions: Position the transmitter such that it will be visible to the camera throughout the entire operation. The transmitter can be positioned monocortically using a two-pin fixation system. With the clamping screw on the anchoring element open, use two pins to attach it to the femur, up to around 10 cm in the proximal direction from the joint line. AESCULAP® recommends using the fixation pins NP1012R or NP1013R with a diameter of 3.2 mm. In principle, the transmitter fixation element is compatible with bone fixation pins of 2.5 mm to 4.0 mm in diameter. The femoral transmitter can be placed in any of four positions; a locking mechanism allows the transmitter adapter to be adjusted into an optimal position for the camera. Once the transmitter is in a good position, use the clamping screw and screwdriver NS423R to lock the adjustment mechanism. This screw also serves to connect the anchoring element to the pins. Check the transmitter to make sure it is firmly anchored into place.

NOTE

When anchoring the device into place, make sure it will not come into conflict with any instruments being used later on.

NOTE

Please turn the screw until it is in contact with the pins, then verify a tight fit and if necessary tighten a little more with moderate force until the assembly is stable. Do not overtighten or force the screw!

NOTE

When removing the two-pin fixation element at the end of the operation, it is essential to release the anchoring screw before screwing the pins out.

If desired, 4.5 mm bicortical screws and RB sleeve NP619R can be used to keep the femoral transmitter anchored to the femur bicortically, approximately 10 cm proximal to the joint line. Pre-drilling for the bicortical screw is done using a 3.2 mm drill NP615R through drill sleeve NP616R. Use the scale on the drill or measuring instrument NP281R to determine what length of bicortical screw will be necessary. Rigid Body NP619R is advanced (through protection sleeve NQ941R when using MIOS® or IQ instruments) and brought into contact with the bone, and then one of the bicortical screws (NP620R – NP625R) is inserted. Initial insertion is mechanical, but then the last few turns should be completed using a manual screwdriver. The transmitter adapter should be pointing toward the femoral head and angled in the direction of the camera; check that it is firmly seated.

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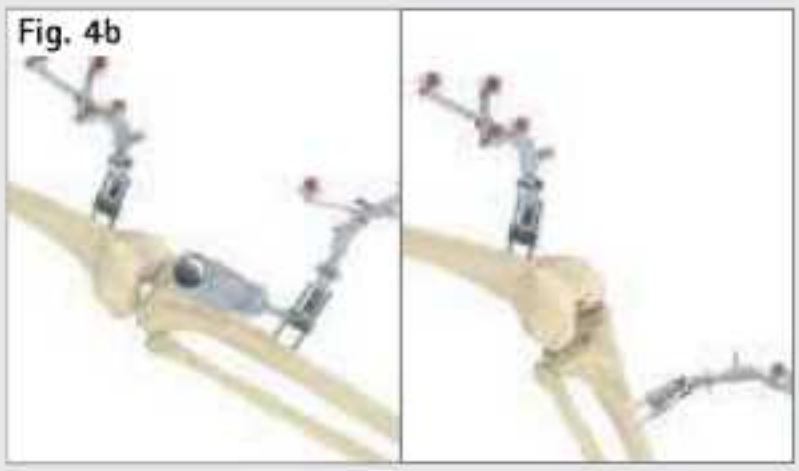
4 | OrthoPilot® SET-UP AND TRANSMITTER POSITION

Fig. 4a

Fig. 4b



4.3 Tibial transmitter

The transmitter can be positioned monocortically using a two-pin fixation system. With the clamping screw on the anchoring element open, use two pins to attach it to the tibia, up to around 10 cm in the distal direction from the joint line (typically from medial). AESCULAP® recommends using the fixation pins NP1012R or NP1013R with a diameter of 3.2 mm. In principle, the transmitter fixation element is compatible with fixation pins of 2.5 mm to 4.0 mm in diameter. The tibial transmitter can be placed in any of four positions; a locking mechanism allows the transmitter adapter to be adjusted into an optimal position for the camera. Once the transmitter is in a good position, use the clamping screw and screwdriver (NS423R) to lock the adjustment mechanism. This screw also serves to connect the anchoring element to the pins. Check the transmitter to make sure it is firmly anchored into place.

OPTION

After pre-drilling with the 3.2 mm drill (NP615R) through the drill sleeve (NP616R) and measuring bicortical screw length as described in Chapter 4.2, an RB (NP619R) is fixed to the tibia via a separate incision, approximately 1 cm long, around 10 cm distal from the joint line. The last turns of the screw should be completed using a manual screwdriver.

NOTE

When fixing the device make sure it will not come into conflict with any instruments being used later on.

NOTE

Please turn the screw until it is in contact with the pins, then verify a tight fit and if necessary tighten a little more with moderate force until the assembly is stable. Do not overtighten or force the screw!

NOTE

When removing the two-pin fixation element at the end of the operation, it is essential to release the anchoring screw before screwing the pins out.

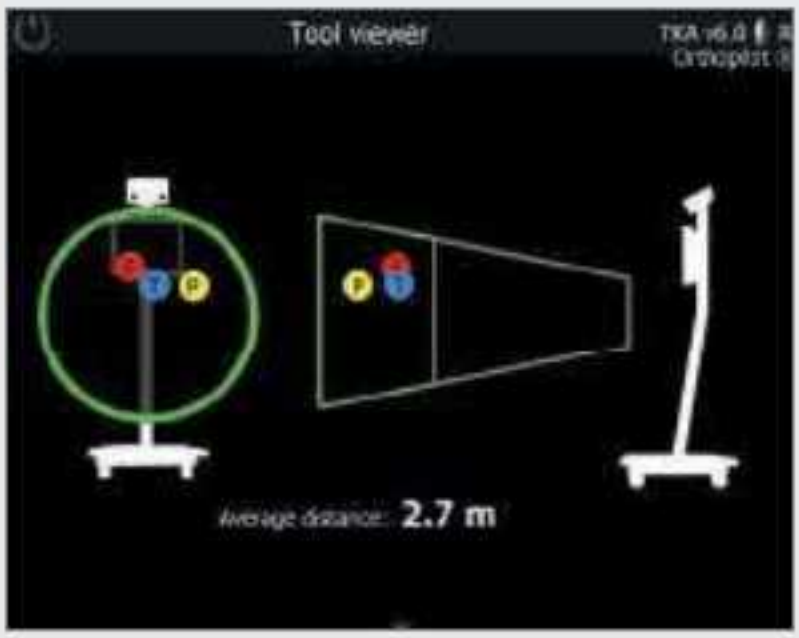
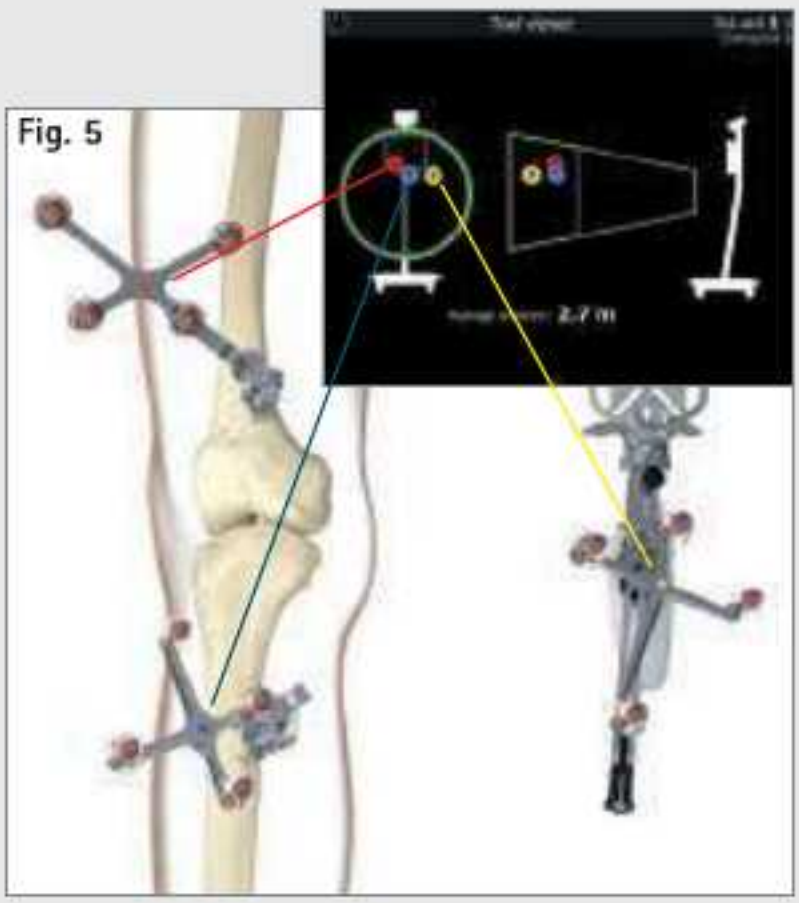


Fig. 5



NOTE

Whenever a transmitter is removed from the bone fixation, e. g. the 2 pin fixation or one of the instruments, the user must ensure in case of reattaching, that exactly the same position is chosen for the fixation of the transmitter as before. Otherwise the values displayed differ significantly from the values displayed before.

4.4 Camera alignment

The camera alignment screen displays the view field of the camera as a three-dimensional volume; users can call it up at any time via the toolbox menu (see instructions for use OrthoPilot® Software TKA version 6 TA015239). Transmitters are displayed within this camera view field as colored (color-coded) dots labeled using corresponding letters:

- Femoral transmitter:
  Red dot labeled "F"
- Transmitter on instrument:
  Yellow dot labeled "P"
- Tibial transmitter:
  Blue dot labeled "T"

If all three transmitters are placed at an optimum distance to the camera (1.8 - 2.2 m for FS101; 2.5 - 3.0 m for OrthoPilot® *Elite*), the camera view field will be displayed outlined in green. The mean distance from the camera to the transmitters is displayed in meters.

TIP

When adjusting camera alignment, make sure that all transmitters remain sufficiently visible as the leg is flexed, extended, adducted or abducted. Sufficient visibility means that the camera can recognize the transmitter in all of these positions. Once users have checked the camera at the beginning of the operation and verified transmitter visibility, it should not be necessary to adjust the camera for the rest of the operation. However, it remains possible to adjust the camera at any time during the operation – except while measuring the center of the hip joint – in order to improve visibility.

The passive transmitter marked in red (FS635) is attached to the femoral Rigid Body adapter; the passive transmitter marked in blue (FS634) is attached to the tibial Rigid Body adapter. The yellow passive transmitter (FS633 or FS636) is attached to whichever instruments are necessary.

AESCULAP® OrthoPilot® TKA

5 | CONTROLS AND INTERACTION

The OrthoPilot® system offers three different means of control / interaction.

5.1 Multitool (FS640 with mounted FS636 transmitter)

Multifunctional instrument used for data acquisition and software control. Click the control button in the handle briefly to record data or confirm interactions. Press and hold the control button in order to open **the ring menu** in the application. From there, users can perform the following actions:

- Toggling forward or backward within the workflow
- Deleting recorded date in current step
- Deleting previously recorded data and returning to the corresponding software step

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NOTE

This function, the only one marked on the menu with a red symbol, is available if no data recording has taken place during the current software step. It cannot be accessed otherwise.

- Accessing the workflow navigator for navigating quickly and easily to selected workflow steps
- Accessing the toolbox for adjusting the camera, acquiring kinematic data, and opening measurement modules for recording points on the femur / tibia
- Accessing an alternative method of determining the center of the hip joint (only during the Determining Hip Joint Center step)
- Using + and - buttons to adjust femur size (only during the Distal femur cut / 4-in-1 Cutting Block Positioning step)
- Skipping extension / flexion gap measurement and femoral planning (only during Extension and Flexion gap step)

  During software steps in which the Multitool or transmitter FS636 with other instruments (e. g., distal cutting block NS334R or one of the 4-in-1 cutting blocks) are not used, the user can perform the above-named actions with a quick / long press of the manual trigger (black) directly on the transmitter.

Ring menu functions are independent of the selected interaction.

5.2 Gesture control (with pointer FS604 and mounted FS633 transmitter)

Users can palpate bone reference points and control the software using specific, defined gestures. To record a point, after placing the pointer precisely and stably on the reference point being recorded in that step, withdraw the pointer axially (Fig. 6a). Be sure to use a controlled motion. Gesturing with the pointer in a vertical clockwise circle will call up the next step in the workflow; a vertical counter-clockwise circle will call up the previous step (Fig. 6b). Gesturing with the pointer in a horizontal counter-clockwise circle will open the ring menu described in Chapter 5.1 (Fig. 6c).

The pointer also has a timer function for use in data acquisition. Hold the tip of the pointer still until the "record" symbol appears on the OrthoPilot® screen, and a blue highlighted frame begins to complete itself continuously. Once the record symbol is completely outlined in blue, the data has been successfully recorded, and the software will proceed to the next step. The controls used to switch forward through individual software steps are the same as the ones described in Chapter 5.1.

Fig. 6a

Fig. 6b

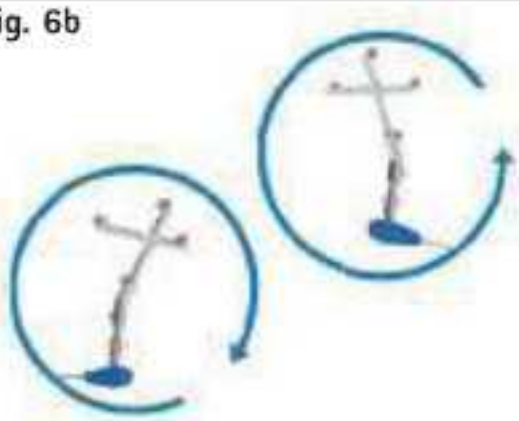


Fig. 6c

AESCULAP® OrthoPilot® TKA

5 | CONTROLS AND INTERACTION

Another software control option is to toggle forward/backward or open the ring menu by positioning the yellow transmitter near the tibial/femoral transmitter. Bring the base of the yellow transmitter for opening the ring menu near the color-coding on the tibial or femoral transmitter (Fig. 7c). To toggle forward, the base of the yellow transmitter must be near the marker sphere furthest away from the base of the tibial/femoral transmitter (Fig. 7b). To toggle back, bring it close to the tibial/femoral transmitter base itself (Fig. 7a). The software toolbox includes a tutorial for all gestures, which describes gestures individually and allows users to practice them.

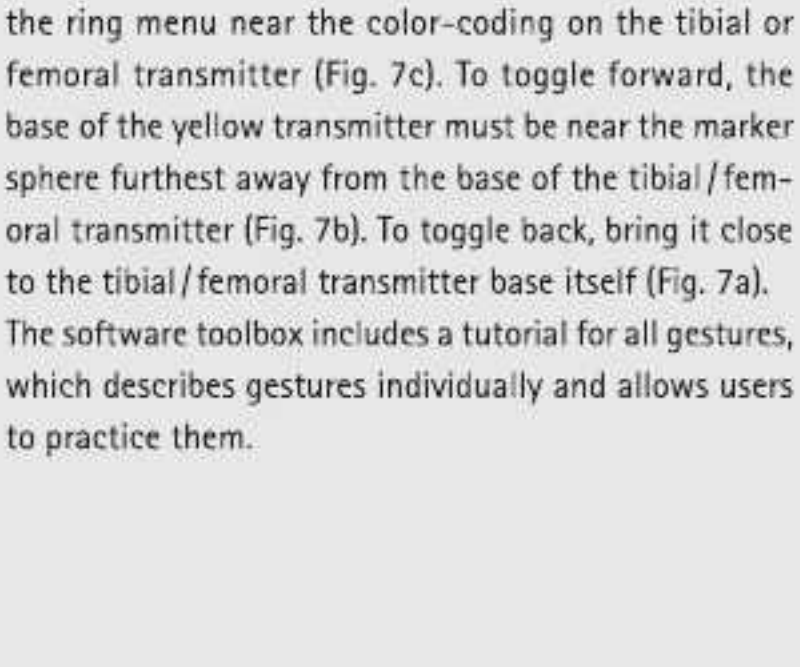


Fig. 7a

Fig. 7b

Fig. 7c

5.3 Foot pedal (wireless, for use with OrthoPilot® system)

The wireless foot pedal is the third control option available to users.

1) Central foot button

Short click: Toggle forward / record data

Long click: Only triggers an action during four software steps:

1. Starts the optional data acquisition process during measurement of the hip joint center.
2. Skips the measurement process in the "determining extension gap" step.
3. Within the "distal femoral resection" step, it is used to increase the size of the previously selected femoral component in stepwise.
4. Likewise, within the "positioning the 4-in-1 cutting block" step, it is used to increase the size of the previously selected femoral component in stepwise.

2) Left foot button

Short click: Toggle back within a workflow

Long click: Delete data within the current step

A long click on the left button only triggers a different action within two steps:

1. Within the "distal femoral resection" step, it is used to reduce the size of the previously selected femoral component in stepwise.
2. Likewise, within the "positioning the 4-in-1 cutting block" step, it is used to reduce the size of the previously selected femoral component in stepwise.

3) Right foot button

Short click: Open the ring menu

Long click: Screen shot

NOTE

When using the OrthoPilot® System FS101 with pointer and foot pedal, use the wired foot pedal (FS007). A short click of the the right button will toggle forward or begin the data recording process. Use a long click to:

- start the optional process for acquiring data on the hip joint center,
- skip the extension and flexion gap measurement process,
- increase the selected size of the femoral component in the "distal femoral resection" and "positioning the 4-in-1 cutting block" workflow step.

The left button is used to toggle backward. Long-pressing the left button deletes any data recorded on the selected screen, or reduces the size of the selected femoral component in the "distal femoral resection" and "positioning the 4-in-1 cutting block" workflow steps. Pressing the black button in the middle will open the menu.

5.4 Special software control features

When using Multitool or gesture controls (not the foot pedal) to toggle forward, the flexion angle range (70 +/- 5°) will be marked in yellow on the "knee joint center", "mechanical axis", "mechanical axis – post-operative" and "kinematic measurement" steps. If the leg is held still within that range for a certain period of time, the software will toggle forward one step. Alternatively, users can always toggle forward or trigger data recording by performing the action specifically defined for their chosen interaction method.

NOTE

Should one of the above-named interaction methods experience a technical failure, the OrthoPilot® system touchscreen can also be used as an interaction platform. This will require someone who is not active directly within the operating field to press the symbols on the screen to trigger the corresponding actions during surgery.

AESCULAP® OrthoPilot® TKA

6 | ENTERING OPERATION- AND PATIENT-SPECIFIC DATA

6.1 Options settings

The physician can choose from among the following options based on his or her preferences:

- Tibia first or Femur first technique,
- with or without soft tissue management
- the physician will also need to select
- whether, and what degree of, femoral rotation in relation to the posterior condyles needs to be preset on the planning screen,
- whether the tibial joint line should be displayed in reference to the "recording tibial reference" or "recording tibial reference – medial" step,
- which reference recording should be used for navigating tibial rotation (pointer reference or reference recording based on trial plateau handle with optional rotational adapter (NP1017R)),
- whether epicondyles are to be additionally palpated (reference: trans-epicondylar line),
- whether to record Whiteside line as additional reference for femur rotation
- whether to use one or two reference points for indicating the tibial resection level,
- whether to include an additional step to optimize the anterior cortex point,
- whether to choose the default Circle movement (O) or the alternative movement pattern (L) for hip centre acquisition,
- whether to display the femoral joint line in reference to the furthest-distal point on the distal condyle, and
- whether, in addition to the mechanical axis, a graphic should be displayed showing medio-lateral stability in varus and valgus over the range of motion.

After having selected these options, the surgeon can use the check-box in the "only show in toolbox" dialog window to decide whether this screen should be displayed each time the software is started. If the box is checked, the next time the software is started, it will go directly to the Patient Data screen with the most recently selected options settings. From this step ("Patient data"), users can select the toolbox (see Chapter 5.1 for explanation) at any time to call up the options screen and change the settings.

6.2 Entering hospital- and patient-specific data

Entering hospital-specific data

Name of surgeon

Hospital / department name

Entering patient data

First name

Last name

Date of birth

Sex

Side being operated on

6.3 Operation data

Position of the OrthoPilot® camera

Ipsi- or contralateral

Implant selection

AESCULAP® Columbus®, e.motion®, e.motion® Pro and VEGA System® implants are supported.

Instrument selection

IQ, Standard and MIOS® instruments are supported.

Selection of interaction options

Users can control the software using the Multitool, the foot pedal, or gesture controls.

Implants and instruments not added during installation will not be displayed for selection. The software prevents any impossible combinations of interaction methods and instruments.

6.4 Multitool set-up

When the Multitool is selected, a Multitool correctly assembled for the side undergoing surgery and the camera position will be displayed on the right side of the Surgery Data screen as well as on a separate screen.

AESCULAP® OrthoPilot® TKA

7 | GENERAL DATA RECORDING

Fig. 8

7.1 Recording the medial and lateral posterior condyles

Place the pointer tip of the Multitool (FS640) or the pointer (FS604) at the center of the posterior medial condyle. Choose the point furthest in the posterior direction – in other words, the one furthest from the anterior femoral cortex point. Do the same for the lateral side.

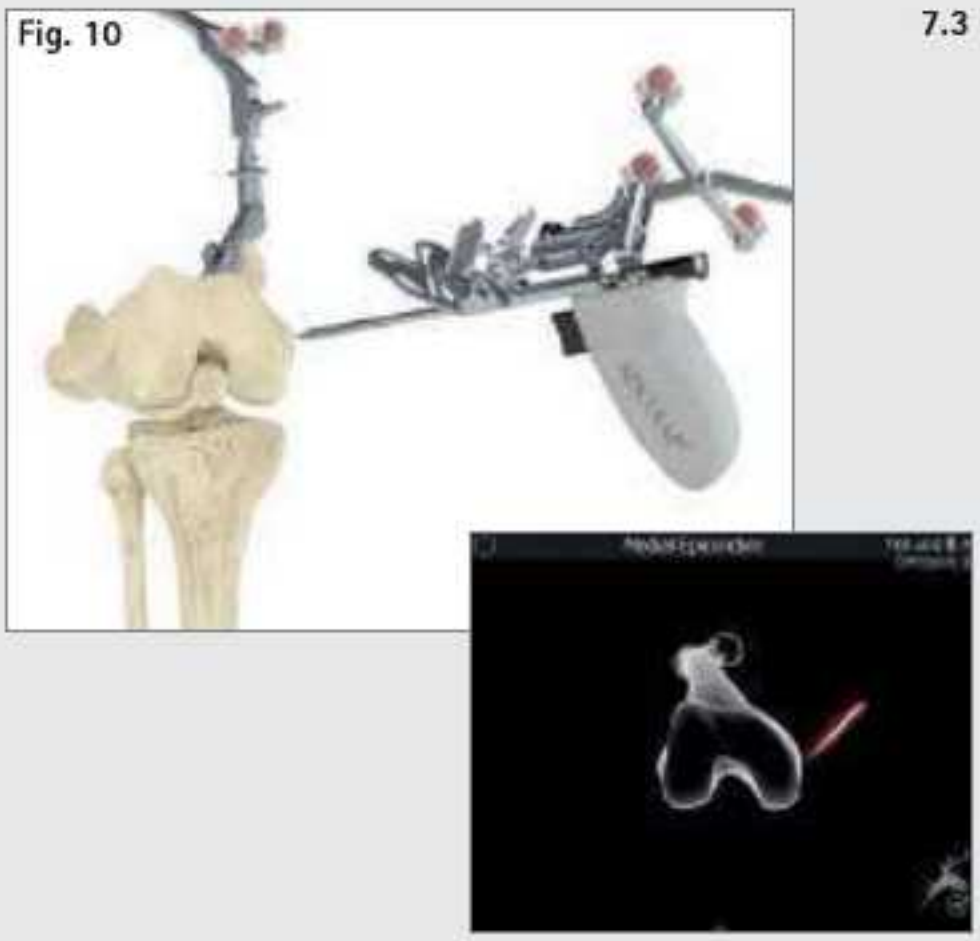
Fig. 9

7.2 Recording the anterior cortex

This reference point is located at the place where the anterior shield ends proximally. In the medio-lateral direction, palpate the point located furthest in the anterior direction.

The distance between this point and the posterior condyles is used as the basis for suggesting femoral component sizes and for calculating the theoretical center of the knee joint. Later on, it is also used to determine whether there is a risk of anterior notching.

Fig. 10



7.3 Recording the medial and lateral epicondyles (optional)

The trans-epicondylar line can be determined by palpating the medial and lateral epicondyles if the corresponding option has been activated. In a later program step, in addition to the dorsal condylar line, the user will also be shown femur rotation in reference to the trans-epicondylar line.

Start by placing the tip of the pointer on the medial epicondyle and record this point. After that, record the lateral point in the same manner.

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7 | GENERAL DATA RECORDING

Fig. 11

7.4 Reference for medial cutting-height display

In this step the bony reference for the medial cutting height display is recorded.

It is advisable to use significant landmarks during palpation, e.g., the deepest point of the defect or the joint surface.

Fig. 12

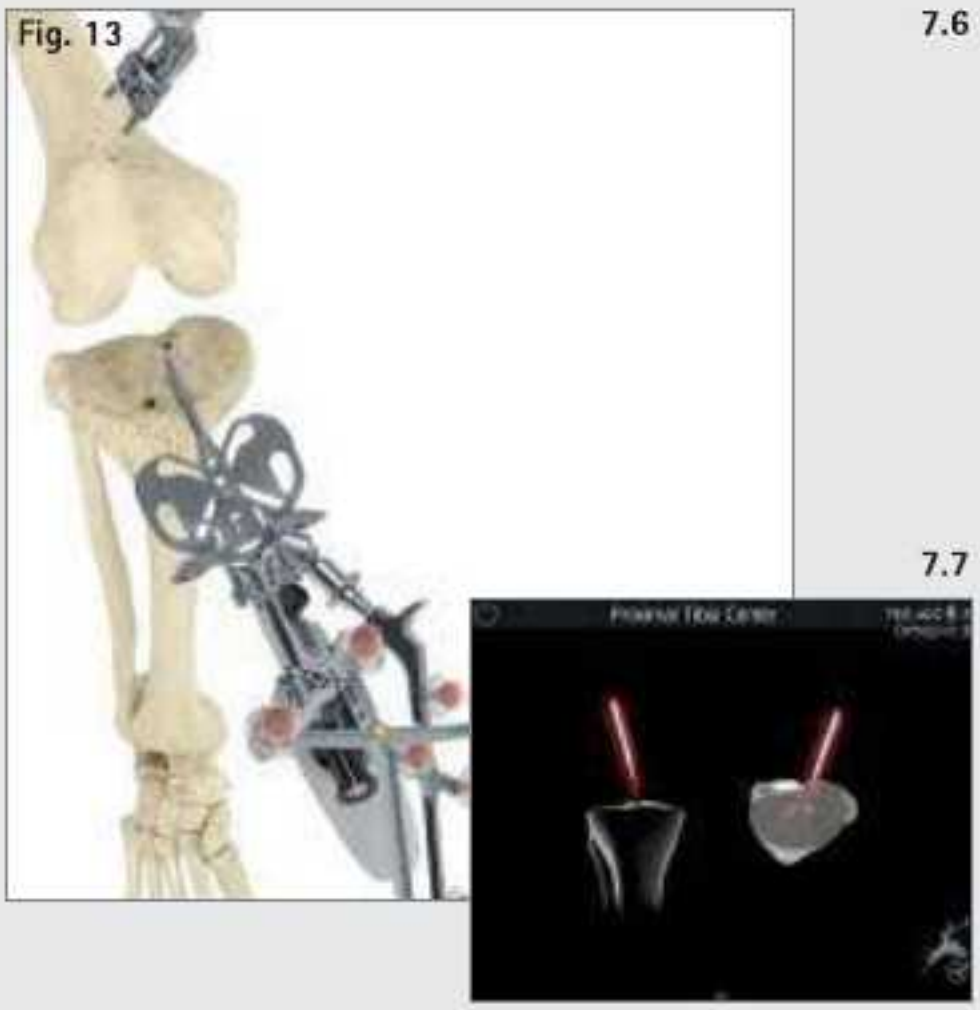
7.5 Reference for lateral cutting-height display

This step entails recording the reference point for the lateral cutting-height display. It is advisable to use significant landmarks during palpation, e.g., the deepest point of the defect or the joint surface.

OPTION

The default settings include palpation of both reference points. Users have the option of changing the settings so that only one reference point is queried. Changing this setting will mean that only one reference point is recorded, and that single reference point will be used to display the cutting height during the "tibial resection" step.

Fig. 13



7.6 **Identifying the tibial center**

This step is used to register the center of the anterior insertion of the ACL. If the patient has no ACL, or degenerative changes have occurred, the point can be found:

- in the center of the medial-lateral diametric line of the tibial head,
- at the transition between the first and second thirds of the anterior-posterior diametric line of the tibial head, measured from the anterior edge.

7.7 **Registering tibial rotation (optional)**

The user has the option of registering approximate tibial rotation in order to perform a dedicated investigation of tibial component rotational alignment later on during the operation. Place the pointer shaft axis on the desired rotation position. For example, the pointer stem can be placed on the tibial plateau along an imaginary line oriented to the medial edge of the tuberositas tibiae, with the tip facing toward the posterior edge of the tibial plateau (target reference: pointer tip at the PCL insertion) (9).

Fig. 14

TIP

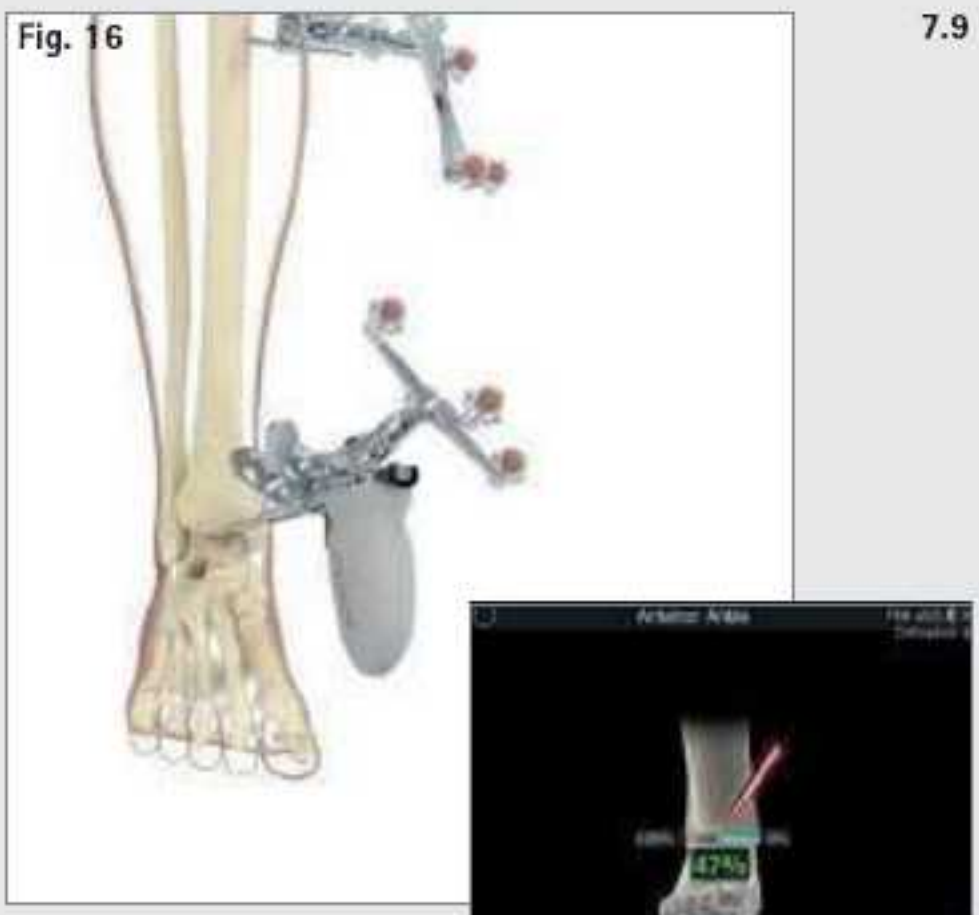
Note the different degrees of variability among different reference points registered intraoperatively; some of these may involve a very high degree of variability (9). Avoid internal rotation of the tibial component, as it would result in lateralization of the tuberositas tibiae, which could cause problems with patella tracking. Internal rotation of both the femoral and the tibial component, in particular, can result in aggravated patella dislocation, increased patella tilt, and subluxation positioning of the patella. Improper rotation of the tibial component also causes excessive stress on the inlay, resulting in accelerated wear.

Fig. 15

7.8 Recording the medial and lateral malleolus

Place the pointer tip at the center of the medial malleolus and record the point. Do the same for the lateral side.

Fig. 16



7.9 Anterior ankle joint point

Register the point by placing the pointer tip at the front edge of the distal tibial, as close as possible to the ankle-joint gap.

The display on screen will assist the surgeon in verifying the anterior palpation point by showing a percentage display starting from the medial malleolus palpation point, with a green safety zone around 50 % +/- 5 %.

TIP

The second metatarsus/second ray or the M. extensor hallucis longus tendon can be used as a landmark. The percentage display serves as a plausibility check. If the point is outside of the green safety zone, it is advisable to re-palpate the malleoli.

Fig. 17a

Fig. 17b

7.10 Registration of the hip center

Once the leg is kept still, an arrow pointing upwards will appear, and the user can start to move the leg towards 12 o'clock.

The **default way of hip center registration** is the circle (O) (Fig. 17a). The regular circle registration can be started after having reached the topmost grey segment of the circle at 12 o' clock position. The motion can be performed in a clockwise or counterclockwise direction depending on the physician's preference. Thereby the femur is moved in such a way, so that the white point is moving over the fields arranged in a circle.

An **alternative hip center acquisition movement** (L) pattern can be installed (Fig. 17b). If installed it is the surgeon's choice and decision in the surgery options screen, which movement pattern to be used for this registration. The alternative L-registration can be started after having reached the topmost grey segment at 12 o' clock position. The motion is performed vertically from top to bottom (12 in direction downwards to 6 o' clock). The vertical motion should be followed by a horizontal one in the lateral direction (abduction of the leg).

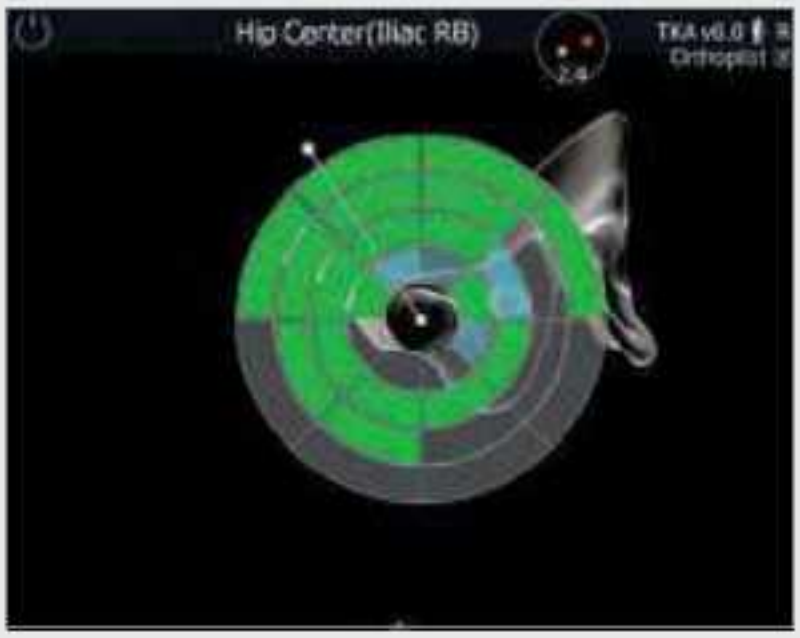
For both acquisition movements, be cautious during the movement to stay within the indicated grey fields until they turn green one by one. Once sufficient data has been obtained, the program will automatically jump to the next step. If the motion described above was uneven or not sufficiently precise, a message reading "Bad acquisition" or "Movement too wide" will appear, and the process will need to be repeated beginning from the first position.

NOTE

Be particularly mindful of:

- not moving the camera during this step,
- whether the femoral transmitter will remain visible through the entire motion,
- whether unrestricted motion is possible (no limitations due to side support, etc.),
- not exerting force on the pelvis through the femur,
- avoiding any type of pelvis movement (responsibility of the surgeon) If this cannot be avoided, please see next chapter,

- Avoidance of a hip flexion angle > 45° (for O acquisition),
- start with the position of the femur low enough, in order to allow the full upward movement until 12 o'clock position (for L acquisition),
- starting a little in adduction allows for enough movement into abduction (for L acquisition)
- moving the femur back to the initial position before performing the abduction (for L acquisition)

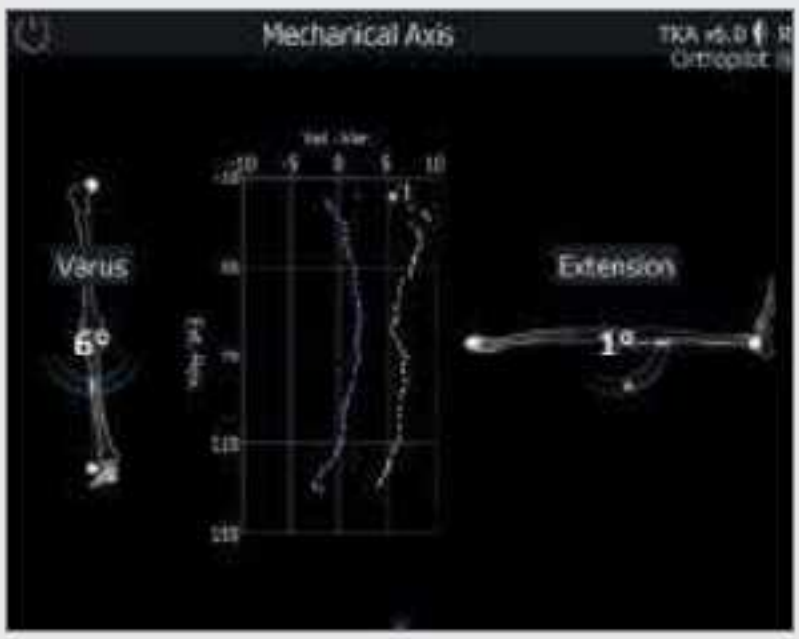


7.11 Optional determination of the hip joint center with pelvic reference

Registering the center of the femoral head will require a reference transmitter firmly anchored to the crista iliaca. This step can be reached via the ring menu in the step "Hip Center" choosing the arrow symbol. The mode itself is displayed in a special window with the note "Femoral head center (pelvic ref)".
Perform large motions with the hip joint until the screen indicates that sufficient data has been obtained. As soon as enough data has been recorded, the program will automatically move to the next step.

7.12 Determination of the knee joint center

In this step, the program tracks the motion of the femoral transmitter in relation to the tibial transmitter and uses it to determine the center of the knee joint.
The screen will display a message reading "knee center". Extend and flex the leg. Hold the leg with one hand in the hollow of the knee. Support with the other hand heel or ankle. Performing a tibial rotation is not absolutely essential, but it can help provide additional precision when performing a 90° bend once two arrows are being displayed on the screen. Fields filled in green indicate that the data has been recorded. Once enough measurement data has been recorded, the software will automatically move on to the next step of the program.
After having covered the maximum range of motion (even without inward or outward rotation) multiple times, the user can also manually trigger the next step, e. g. in case of a flexion contracture that does not allow for full extension.



7.13 Display of the initial mechanical leg axis

The following step dynamically displays the current state and position of the leg in coronal and saggittal view. The optionally displayed graphic shows all varus/valgus leg positions in relation to the corresponding the flexion angle.

Adding varus or valgus stress allows the user to record the maximum values for each flexion angle. This indicates the medio-lateral stability of the knee joint, which can offer initial information on the need for a release to be carried out later on.

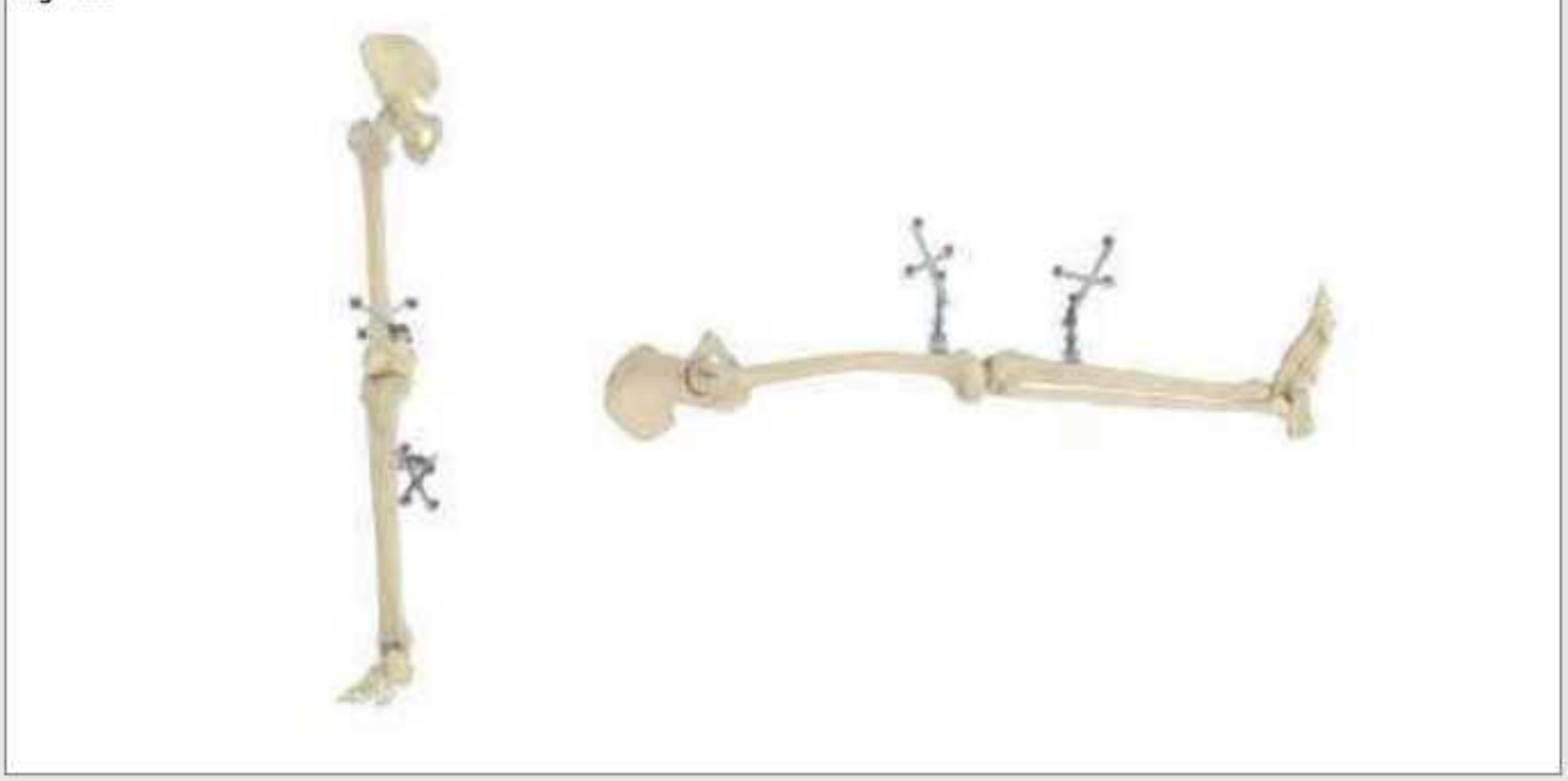
NOTE

For information on the Femur first technique, see Chapter 9: Femur first technique

TIP

This step serves to check the plausibility of an axis malalignment in comparison to a full-leg x-ray taken pre-operatively. In case plausibility is not given, it is the surgeon's responsibility to redo registrations and check again.

Fig. 18



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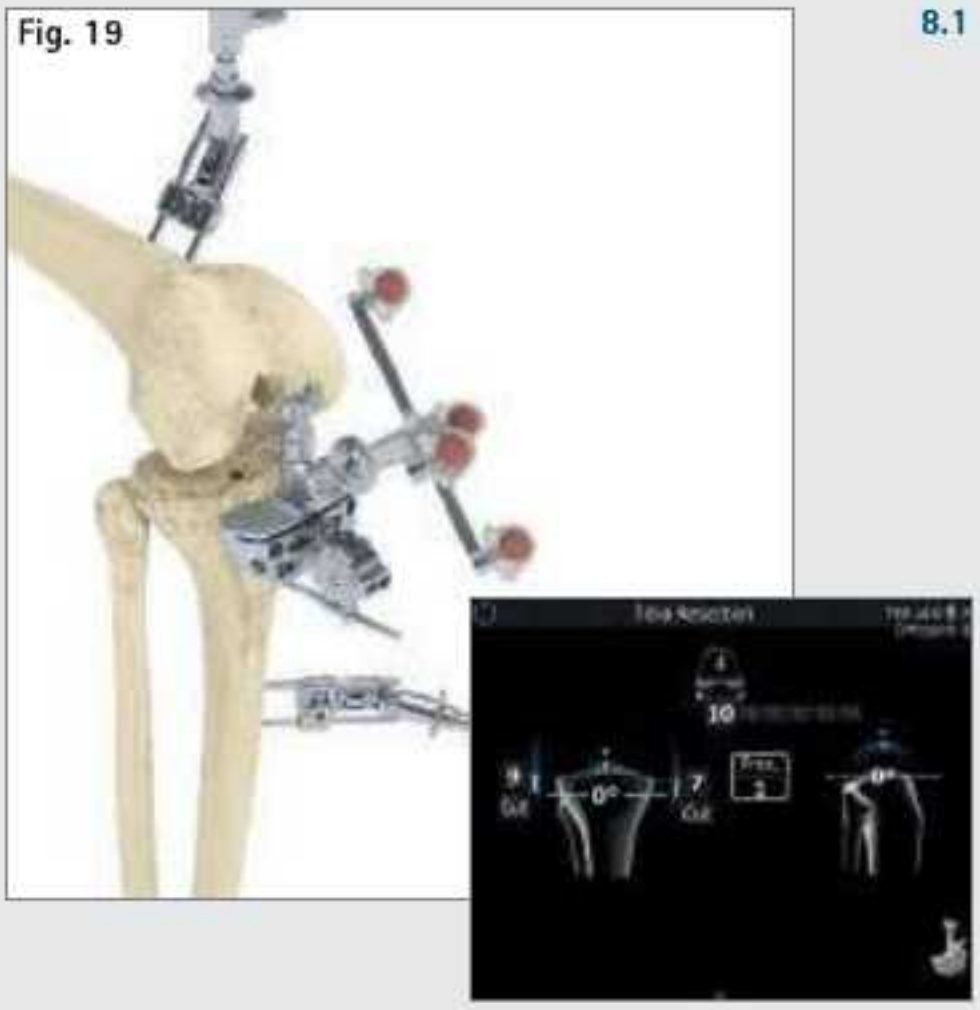
8 | TIBIA FIRST TECHNIQUE

Fig. 19



8.1 Resection of the tibial plateau

Connect the modular transmitter adapter (FS626R) and the cutting block (NS334R, IQ instruments) to the corresponding transmitter (FS633 or FS636). Move the cutting block proximally or distally (from the joint line) to determine the exact resection height in relation to the bony reference points palpated medially and laterally on the tibia (program steps "medial tibial reference" and "lateral tibial reference"). The tibial cutting block can be navigated freely to the desired varus/valgus and slope values in relation to the mechanical axis. AESCULAP® recommends a 0° posterior slope for its prosthesis systems.

Start by fixing the tibial cutting block using two headless screw pins from the anterior direction. After that, if necessary, use the available pin holes to maneuver the cutting block and adjust the cutting height in 2 mm steps.

Once the desired resection height, slope, and varus/valgus alignment have been achieved, use an additional screw pin with head (convergent, from the medial/lateral direction) to finish the fixation of the cutting block and then proceed with the resection.

Based on previous palpations in the anterior-posterior dimension, preliminary femoral size calculations and possible combinations with tibial sizes in the selected prosthesis system will be displayed at the top of the screen in the center.

TIP

To prevent contamination of the marker spheres on the transmitters, it is advisable to either remove the transmitters or cover them until the resection is finished.

TIP

Users also have the option of using an alignment instrument (NP1018R) to assist with IQ cutting block alignment. Start by connecting the alignment instrument to the cutting block (with attached FS626R and corresponding transmitter (FS633 or FS636)) using the correct interface, and then fixing it at a resection height of around 10 mm (distal to the tibial joint line) using a headless screw pin. Rotate around the screw pin to adjust varus/valgus settings. Adjust to the desired resection height (+/- 4 mm) and tibial slope (+/- 8°) manually using the two adjustment knobs or screwdriver NP618R.

Fig. 20

8.2 Checking tibial resection

The tibia check plate of the Multitool (or tibia check plate NP617R/NP617RM) is used to check and record the tibial resection. The actual position and orientation of the resection plane in relation to the mechanical axis (with respect to varus/valgus angle and tibial slope) will be shown on the screen. As soon as the check plate is stable, values can be recorded. The data recorded when checking the tibial resection will be used in later calculations, which is why it is essential that the value has to be re-recorded if any tibial resections are performed later on.

Fig. 21

8.3 Record condyles

The distal and posterior condyles are registered with the Multitool (see illustration at left). If using gesture or footswitch, it is also possible to register the distal and posterior condyles using the corresponding alignment instrument (NS320R) with foot plates (NQ958R). Sagittal alignment is shown on the right-hand side of the screen. Record the data when the block is vertical to the mechanical femoral axis on the sagittal plane (i.e., the screen shows a slope of around 0°).

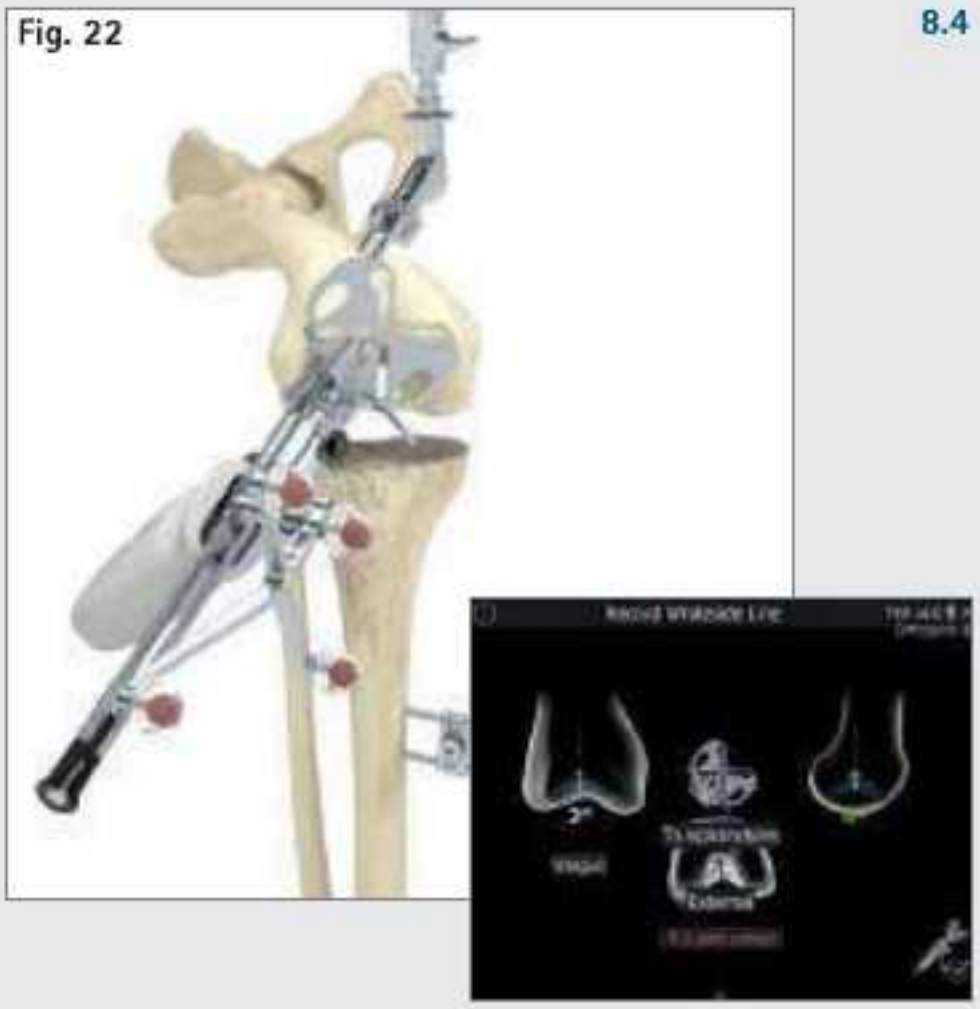
If the epicondyles have been palpated (optional), the angle between the trans-epicondylar line and the posterior condylar line (determined using the procedure described above) will be shown in the middle of the screen. If this value is not plausible, it is advisable to re-palpate the epicondyles.

NOTE

Four-point contact is essential!
It is used as the basis for

- recommending femoral component sizes,
- displaying extension and flexion gap measurements,
- displaying cutting height for distal and posterior femoral resections, and
- displaying femoral component rotation.

Fig. 22



8.4 Recording Whiteside line

The Whiteside line is recorded using the tibia check-plate of the Multitool, or with orientation block NS320R without foot plates.

At 0° extension/flexion, maneuver the recess to be used (marked in blue on the screen) visually to overlap with the Whiteside line.

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8 | TIBIA FIRST TECHNIQUE

Fig. 23

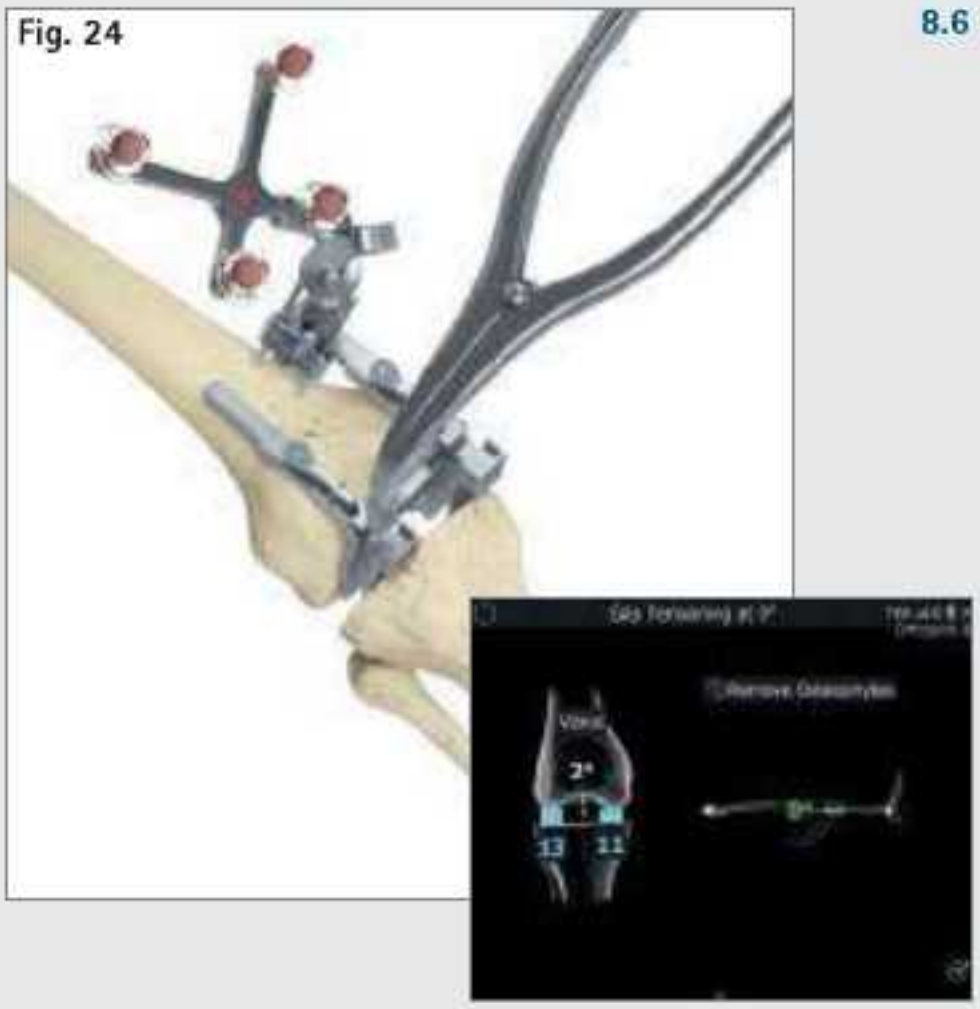
8.5 Optimization of the anterior cortex

After the distal and posterior condyles have been recorded, the next step is to optimize the anterior point on the femur using the pointer tip. The initially recorded anterior cortex point. OrthoPilot® will guide you with blue arrows to the spot at which the A/P size of the femoral implant matches the proximo-distal dimension. The value field positioned distally to the femoral component shows the size of the femoral implant in the A/P direction.

The value field above the femoral component shows the size of the femoral implant in the proximo-distal direction.

Underneath, in the center of the screen, there is a "running display" showing the corresponding femoral size when the pointer is moved proximally or distally, and indicating possible combinations with tibial sizes. These combination options are based on the implant system selected at the beginning.

Fig. 24



8.6 Measuring the joint gap in flexion and extension

Before measuring flexion/extension gaps, remove any osteophytes that could affect ligament and capsular tension. With the leg extended as far as possible (0° +/- 5°) place the distractor (NE750R) between the tibial resection and the distal femoral condyles, and then spread using the spreading pliers (NP609R or NP605R), applying equal medial and lateral force. To ensure precise measurement, the plates of the distractor must be flush with the tibial resection plane.

The OrthoPilot® screen will show the medial and lateral gap measurements in millimeters and the mechanical leg axis in degrees (which provides initial information about potential ligament release), as well as the degree of flexion.

Once this data has been recorded, release the distractor and bend the leg at a 90° angle.

Measurements can be taken as long as the leg is in the flexion position marked in green. Make sure to keep the leg as stable as possible during the measurement process. Real-time gap values will be shown on the tibia in blue. By recording the values, the software takes you into the next step.

In this step, it is possible to skip completely the distraction and the femoral planning steps by choosing the double forward arrow in the toolbar or the ring menu, or by doing a long footswitch press (see Chapter 5).

Fig. 25

Data is recorded in this step using the same process as described for extension. As described in Chapter 5, it is always possible to redo these gap measurements (e.g., following a ligament release) using the software's back and delete functions.

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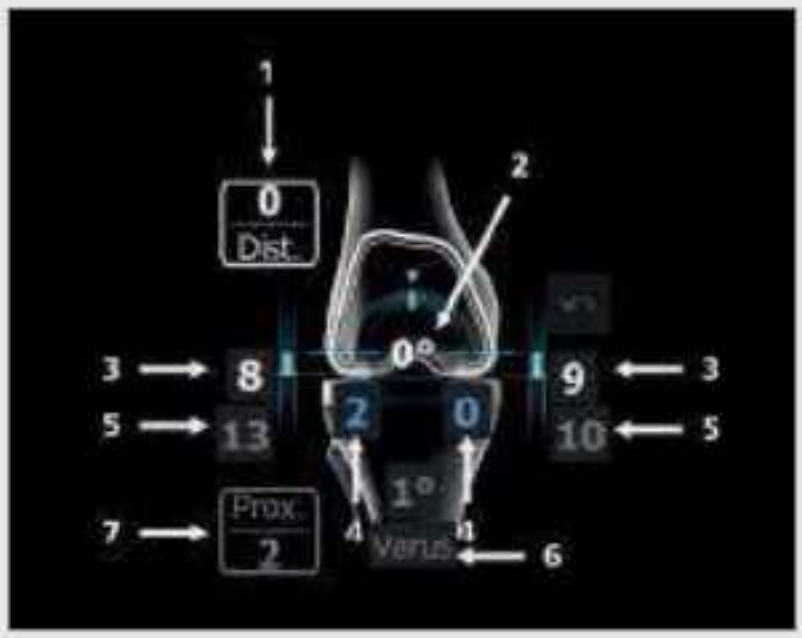


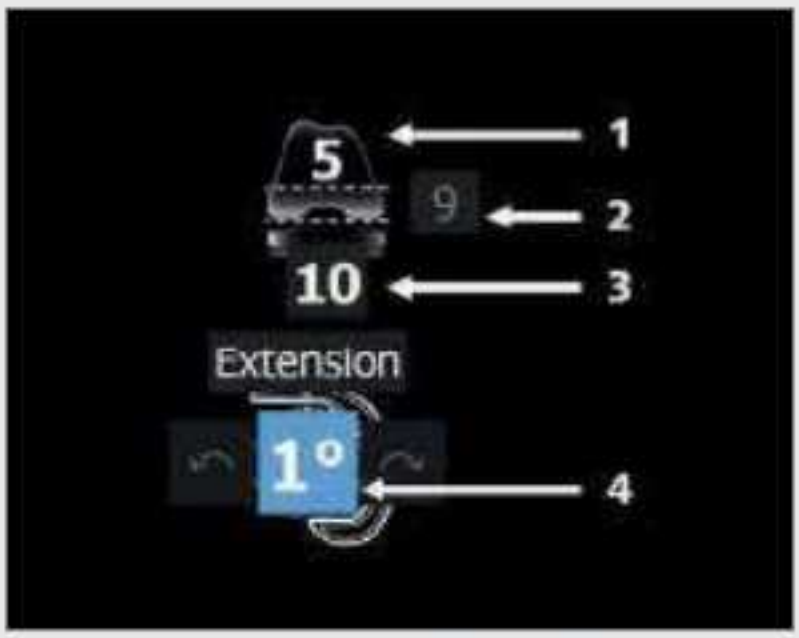
8.7 Femoral planning

TIP

When elements on the planning screen are selected using the virtual mouse pointer, various control symbols (plus and minus symbols, rotation arrows) will appear; they can be operated using the control options described in Chapter 5.

In extension

1 Information on proximal/distal joint line shift (0 mm here), starting from the most prominent distal condyle recorded during the "condyle reference" step. Displaying the joint line is optional. It can be switched on or off in the options screen.
2 Varus/valgus display (0° here), indicated with the arch in the femur and the number given in degrees.
3 Distal femoral cutting height (here: 8 mm from lateral, 9 mm from medial), indicated using blue bars and white numbers.
4 Remaining extension gap after planned position of femur implant components (here: 2 mm lateral, 0 mm medial), indicated using blue bars and blue numbers. If the remaining gap values are negative, they will be shown using yellow bars and yellow numbers. Clinically speaking, a negative/yellow gap value means stretching of the soft tissue (e.g., ligaments).
5 The grey numbers (here, 13 mm lateral and 10 mm medial) are non-changeable reminder values based on the ligament tension measured in extension.
6 Recording of tibial resection (here: 1° varus).
7 Tibial joint line shift (starting from the most proximal reference point recorded); here: 2 mm proximal.

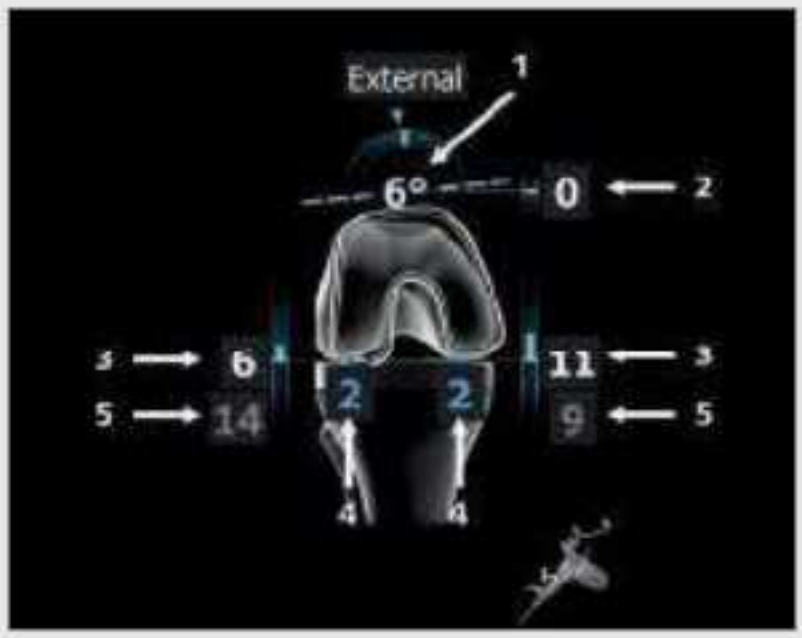


Display and control elements (center)

1 & 2 Size 5 femoral implant with distal implant thickness of 9 mm for Columbus®.

2 Total height of tibial components (metal plate with PE inlay); here: 10 mm.

3 Femoral component extension / flexion display; here: 1° extension.



In flexion

1 Rotation (here: 6° external rotation to the posterior condyles recorded), indicated using the arch in the femur and a number in degrees.

2 Anterior cutting height (here: 0 mm in relation to the anterior cortex point palpated (the location of the anterior femoral shield to that measured point). If the femoral shield would end up underneath that palpated point (notching), the number will turn red (see Chapter 7.2 and Chapter 8.5).

3 Posterior femoral cutting height (here: 6 mm lateral, 11 mm medial), indicated using blue bars and white numbers.

4 Remaining flexion gap following planned position of implant components (here: 2 mm later and 2 mm medial), indicated using blue numbers and blue columns, or yellow numbers and columns if the remaining flexion gap is negative. Clinically speaking, a negative or yellow gap value means stretching of the soft tissue (e.g., ligaments).

5 The grey numbers (here, 14 mm lateral and 9 mm medial) are non-changeable reminder values based on the ligament tension measured in flexion.

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8 | TIBIA FIRST TECHNIQUE

Fig. 26a

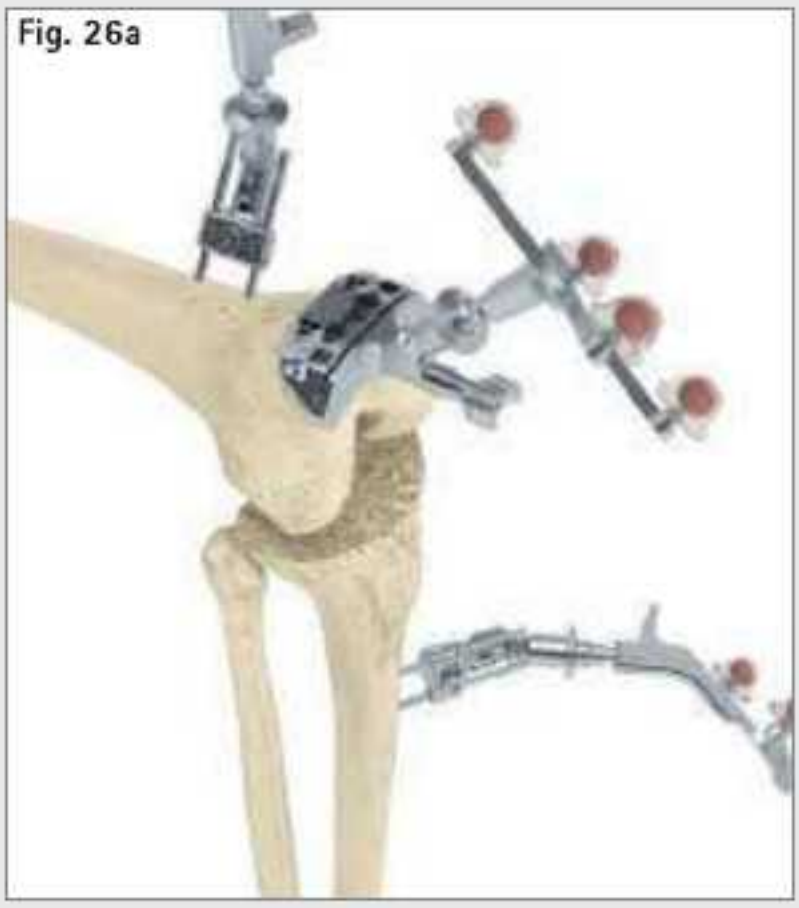


Fig. 26b

8.8 Distal femoral resection

Attach the distal femoral cutting block to the corresponding yellow transmitter. The precise resection plane in relation to the medial and lateral distal condyles recorded on the femur is determined by moving the cutting block in the proximal or distal direction. Target values are the values selected during femoral planning. Once these values are attained in terms of varus/valgus angle, resection plane, and slope, the values will turn green. Another orientation aid for determining approximate resection height is the distal thickness of the femoral implant, which is displayed at the top of the screen in the middle. Users obtain additional information about the joint line shift in relation to the "condyle references" step (in the example shown: 0 mm).

TIP

Users also have the option of using a alignment instrument (NP1018R) to assist with IQ cutting block alignment. Start by connecting the alignment instrument to the cutting block (with attached FS626R and corresponding transmitter (FS633 or FS636)) using the correct interface, and then anchoring it at a resection height of around 10 mm (proximal to the femoral joint line) using a headless screw pin. Rotate around the screw pin to adjust varus/valgus settings. Adjust to the desired resection height (+/- 4 mm) and tibial slope (+/- 8°) manually using the two adjustment knobs or screwdriver NP618R.

TIP

To prevent contamination of the marker spheres on the transmitters, it is advisable to either remove the transmitters or cover them until the resection is finished.

Fig. 27

8.9 Checking distal resection

After completing the distal femoral resection, check the resection plane using the corresponding 4-in-1 cutting block with adapter FS626R and transmitter (FS633 or FS636).

Fig. 28

8.10 Setting rotation and A/P positioning

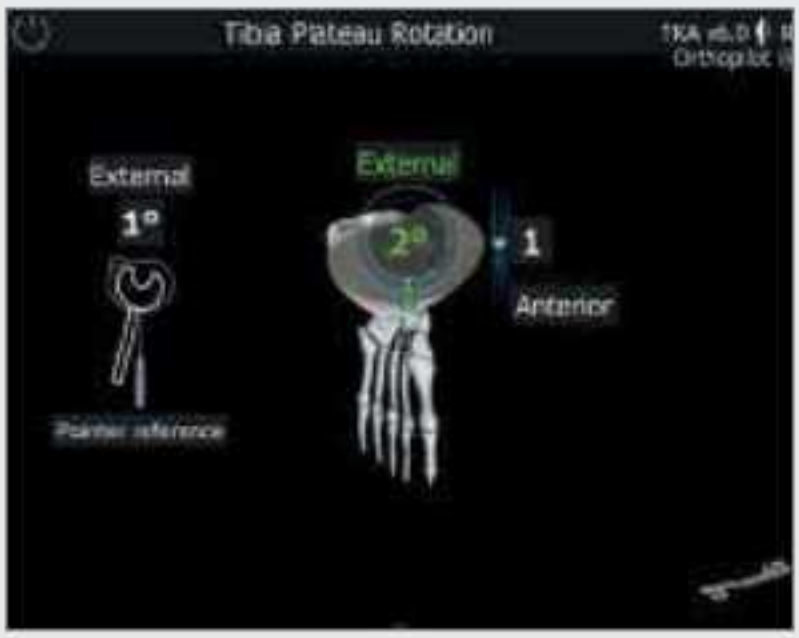
Rotation and A/P position is set using the 4-in-1 cutting blocks. The rotation value is displayed in relation to the recorded posterior condyles. The A/P position in relation to the anterior cortex as well as the posterior cutting height and the resultant remaining gaps in flexion are displayed. Once the desired rotation position has been attained, the corresponding cutting block for the femoral size plus transmitter FS633 or FS636 can be fixed by two distal pins and two pins from the medial and lateral side through the convergent pin holes. After that, proceed with resections: first anterior, then posterior, then chamfer. Prior to the chamfer cuts the distal pins need to be removed. After completing the resections, proceed with implantation – starting with trial implants, and then moving to final implants.

TIP

The rotation value is displayed in relation to the recorded posterior condyles. Regarding rotation, users have the option of running a comparison to the palpated epicondyles (optional, see Chapter 7.3) and/or the Whiteside line (optional, see Chapter 8.4). The corresponding information will be displayed at the left edge of the screen. In addition to the planned femoral size, the screen will display possible tibial implant combinations based on the prosthesis system selected. The slope and/or extension/flexion angle of the distal resection will also be shown on the right-hand side of the screen. The femoral size can be adjusted at this stage if desired.

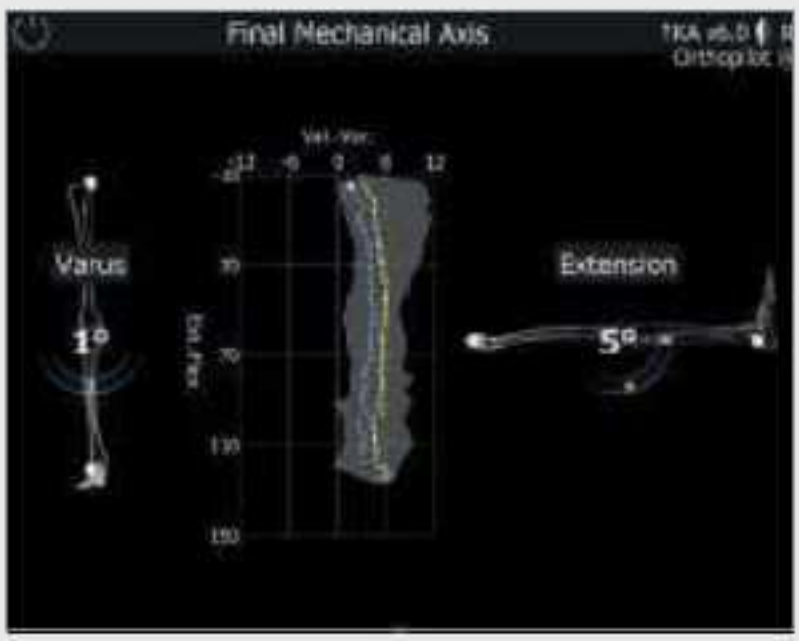
8.11 Tibia rotation reference (optional)

The trial tibial plateau and the tibial handle (NQ378R) can be used along with the navigation adapter (NP1017R) to record a reference position. Selected examples include anatomical coverage of the tibial plateau, or positioning the trial tibial plateau after moving the leg into a deep flexion or full extension. With the latter, in particular, make sure to position the femoral transmitter such that it will not conflict with other instruments.



8.12 Setting tibial rotation

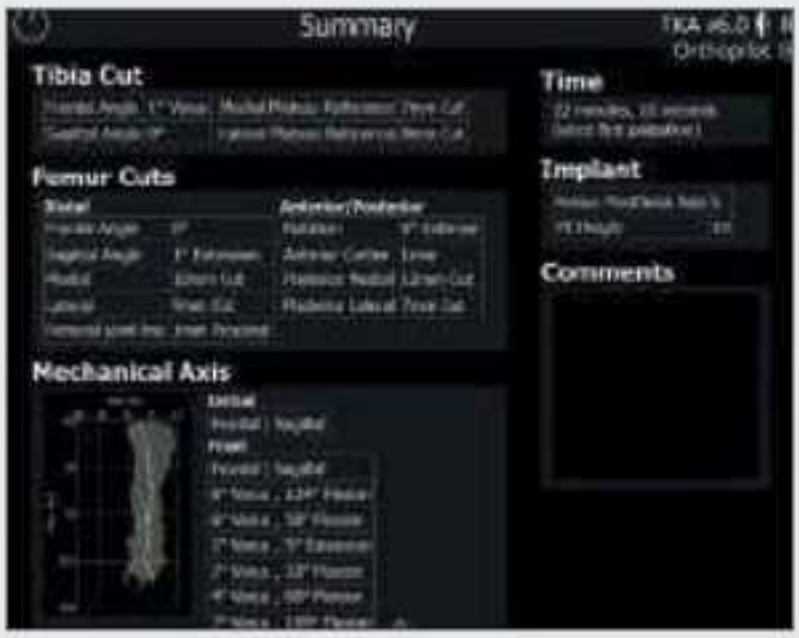
Use the tibial handle with mounted navigation adapter (NP1017R) and the corresponding transmitter (FS633/FS636) to navigate the position of the tibial plateau in relation to one or both of the previously recorded references (see Chapter 7.7/Chapter 8.11). If both references are selected (optional), a separate window on the left will show the deviation to the pointer reference. The indicator in the middle of the screen will then show the deviation to the plateau reference just recorded, including A/P shift.



8.13 Mechanical axis

The mechanical axis (varus/valgus angle) and maximum possible leg extension/flexion achieved can be checked intraoperatively using trial implants, and then post-operatively using the final implants. This gives users documented results of the surgery, which can be added to the patient's medical record if desired. The optionally displayed graphic shows all varus/valgus leg positions based on the flexion angle.

Adding varus or valgus stress allows the user to record the maximum values for each flexion angle. This indicates the medio-lateral stability of the knee joint.



8.14 Summary

The final screen summarizes the main steps of the operation. It shows information regarding the resections performed, the navigation time required, the implants used, and the pre- and post-operative mechanical axes. It also provides a commentary field for any additional notes and comments on the operation.

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9 | FEMUR FIRST TECHNIQUE

NOTE
Please follow all steps through the end of Chapter 7 and then proceed from the beginning of Chapter 9.

9.1 Condyle reference/Recording the Whiteside line

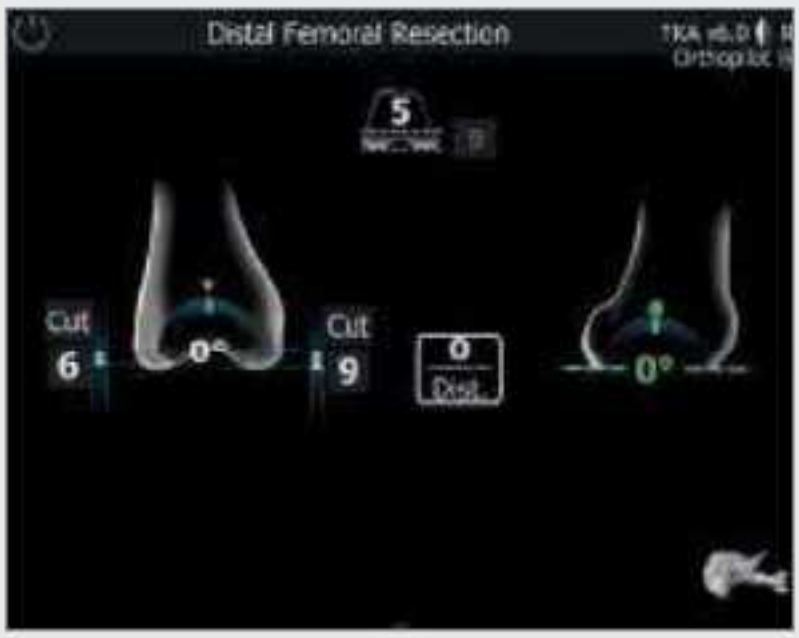
See Chapter 8.4

Differences with Femur first:

Simultaneous recording of Whiteside line and distal condyles.

9.2 Optimizing the anterior cortex point

See Chapter 8.5



9.3 Distal femoral resection

See Chapter 8.8

Differences with Femur first: No target values shown, as femoral planning has not been carried out. No gap information displayed as gaps have not been measured.

9.4 Checking distal resection

See Chapter 8.9

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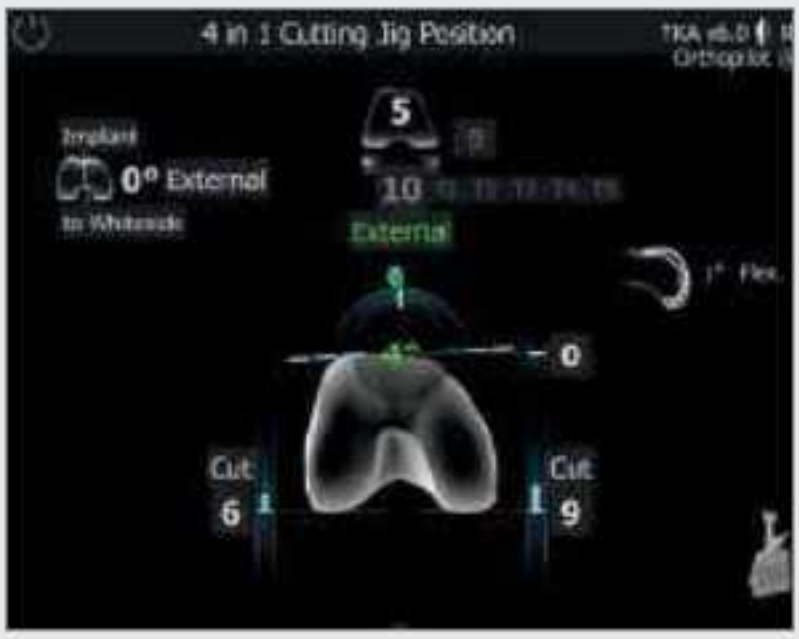
9 | FEMUR FIRST TECHNIQUE



9.5 Positioning the 4-in-1 cutting block

See Chapter 8.10

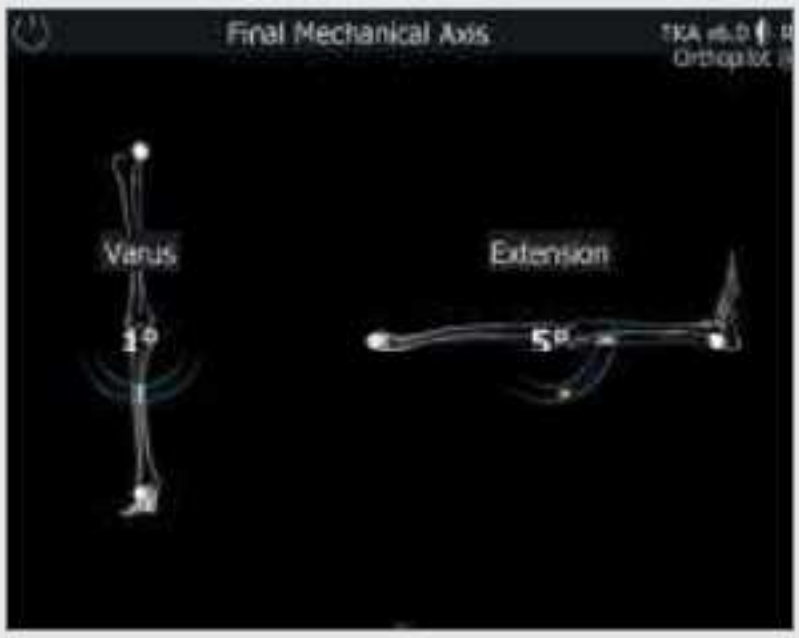
Differences with Femur first: No gap information displayed as gaps have not been measured. No femoral planning takes place, so no target values from the planning stage are shown. The rotation value in relation to the posterior condyles turns green as soon as it corresponds to the previously recorded position according to Whiteside, i. e. the Whiteside display in the upper left corner shows 0°.

9.6 Positioning the tibia cutting block

See Chapter 8.1

9.7 Recording the tibial resection

See Chapter 8.2



9.8 Mechanical axis – post-operative

See Chapter 8.13

AESCULAP® OrthoPilot® TKA

9 | FEMUR FIRST TECHNIQUE

9.9 Surgery summary

See Chapter 8.14

Differences with Femur first: The following information cannot be displayed, unlike with Tibia first:

- PE height

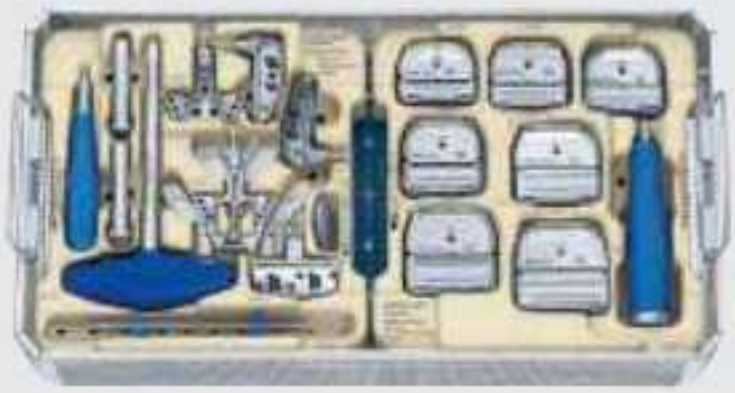
10 | INSTRUMENT SET OVERVIEW – OrthoPilot® TKA VERSION 6

10.1 Standard instruments – NP611

OrthoPilot® TKA V4.0 PERIPH.INSTR.PASSIVE NP168		
NP169P	OrthoPilot® TKA V4.0 TRAY PERIPH.PASSIVE	1
JF213R	1/1 SIZE PERF BASKET 485X253X76MM	1
JF511	CLOTH F.LINING DEEP CONTAINERS	1
FS633	OrthoPilot® PASSIVE TRANSMITTER (YELLOW)	1
FS634	OrthoPilot® PASSIVE TRANSMITTER (BLUE)	1
FS635	OrthoPilot® PASSIVE TRANSMITTER (RED)	1
NP615R	BICORTICAL SCREW DRILL BIT 3.2MM DIA.	1
NP281R	OrthoPilot® SCREW LENGTH GAUGE	1
NP616R	BICORTICAL SCREW DRILL GUIDE 3.2/100MM	1
NP618R	RB SCREW DRIVER ON MOTOR	1
NP619R	OrthoPilot® TRANSMITTER MOUNTING SLEEVE	3
NP620R	OrthoPilot® BICORTICAL SCREW 30MM	2
NP621R	OrthoPilot® BICORTICAL SCREW 35MM	2
NP622R	OrthoPilot® BICORTICAL SCREW 40MM	2
NP623R	OrthoPilot® BICORTICAL SCREW 45MM	2
NP624R	OrthoPilot® BICORTICAL SCREW 50MM	2
NP625R	OrthoPilot® BICORTICAL SCREW 55MM	2
TA011029	INSTRUCTIONS FOR PASSIVE RIGID	1
TE899	PACKING STENCIL F/NP169P (NP168)	1

OrthoPilot® TKA V4.0 SET PROSTH.INSTR. NP602		
NP603P	PROSTHESIS INSTRUMENTS MOLDED TRAY #2	1
JF213R	STANDARD DIN PERF BASKET 485X253X 76MM	1
FS604	OrthoPilot® STRAIGHT POINTER	1
NP617RM	OrthoPilot® CUT CHECK PLATE	1
NP596R	TIBIAL CUTTING BLOCK RIGHT (NAV)	1
NP597R	TIBIAL CUTTING BLOCK LEFT (NAV)	1
NP598R	FEMORAL CUTTING BLOCK DISTAL (NAV)	1
NP608R	OrthoPilot® UNIVERSAL POSITIONING GEARS	1
NM769R	OrthoPilot® TRANSMITTER FOOT PLATE	1
NM743	OrthoPilot® ELASTIC FOOT STRAP	2
JF511	CLOTH F.LINING DEEP CONTAINERS	1

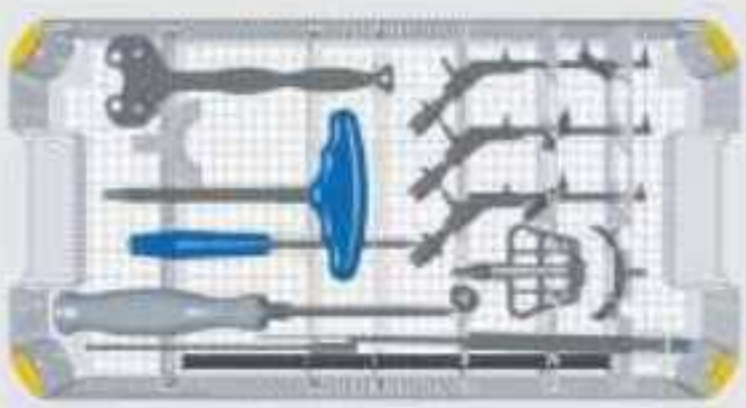
10.2 Optional: MIOS® set



Columbus® MIOS® INSTRUMENTATION NE340		
NQ934	Columbus® MIOS® SET INSTRUMENTS PART 1	1
NQ936	Columbus® MIOS® SET 4-IN-1 CUTTING GUIDES	1
NQ939P	MIOS® TRAY F/BONE LEVER SET	1
JF214R	1/1 SIZE PERF BASKET 485X253X106MM	1
JF511	CLOTH F.LINING DEEP CONTAINERS	1
TE894	PACKING STENCIL F/NQ935P+NQ937P (NE340)	1

e.motion® MIOS® INSTRUMENTATION NE490		
NQ930	e.motion® MIOS® SET INSTRUMENTS PART 1	1
NQ932	e.motion® MIOS® SET 4-IN-1 CUTTING GUIDES	1
NQ939P	MIOS® TRAY F/BONE LEVER SET	1
JF214R	1/1 SIZE PERF BASKET 485X253X106MM	1
JF511	CLOTH F.LINING DEEP CONTAINERS	1
TE893	PACKING STENCIL F/NQ931P+NQ933P (NE490)	1

10.3 IQ Instruments

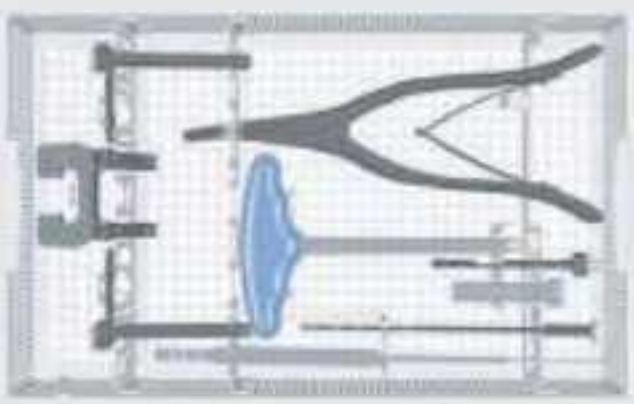


IQ SET NAVIGATION INSTRUMENTS NS720		
NS721R	IQ TRAY NAVIGATION INSTRUMENTS	1
NS726R	IQ e.motion® INSERT NAVIG.INSTR.F/ NS721R	1
NP617RM	OrthoPilot® TIBIAL CHECKING PLATE MODIF.	1
FS604	OrthoPilot® STRAIGHT POINTER	1
FS633	OrthoPilot® PASSIVE TRANSMITTER (YELLOW)	1
FS634	OrthoPilot® PASSIVE TRANSMITTER (BLUE)	1
FS635	OrthoPilot® PASSIVE TRANSMITTER (RED)	1
NP619R	OrthoPilot® TRANSMITTER MOUNTING SLEEVE	3
NM769R	OrthoPilot® TRANSMITTER FOOT PLATE	1
NM743	OrthoPilot® ELASTIC FOOT STRAP	2
NP615R	BICORTICAL SCREW DRILL BIT 3.2MM DIA.	1
NP618R	RB SCREW DRIVER ON MOTOR	1
NP281R	OrthoPilot® SCREW LENGTH GAUGE	1
NP616R	BICORTICAL SCREW DRILL GUIDE 3.2/100MM	1
NP620R	OrthoPilot® BICORTICAL SCREW 30MM	2
NP621R	OrthoPilot® BICORTICAL SCREW 35MM	2
NP622R	OrthoPilot® BICORTICAL SCREW 40MM	2
NP623R	OrthoPilot® BICORTICAL SCREW 45MM	2
NP624R	OrthoPilot® BICORTICAL SCREW 50MM	2
NP625R	OrthoPilot® BICORTICAL SCREW 55MM	2
NQ941R	MIOS® TISSUE PROT.SLEEVE F/RIGID BODY	1
NQ940R	MIOS® HANDLE F/TISSUE PROTECTION SLEEVE	1
FS626R	IQ OrthoPilot® TKA RB-ADAPTER MODULAR	1
NS320R	IQ NAVIGATED FEMORAL ALIGNMENT BLOCK	1
NQ958R	MIOS® Y-FOOTPLATE F/ALIGNMENT BLOCK	1
JA455R	LID FOR OrthoTray® DIN W/O HANDLE	1
NS423R	IQ SCREW DRIVER SW3.5	1
TA020007	USER MANUAL FOR KNEE-INSTRUMENTS	1
TF070	GRAPHIC TEMPLATE F/NS721R+NS726R (NS720)	1
TA014010	IFU FOR ALUMINIUM GRAFIC TEMPLATES	1

AESCULAP® OrthoPilot® TKA

10 | INSTRUMENT SET OVERVIEW – OrthoPilot® TKA VERSION 6

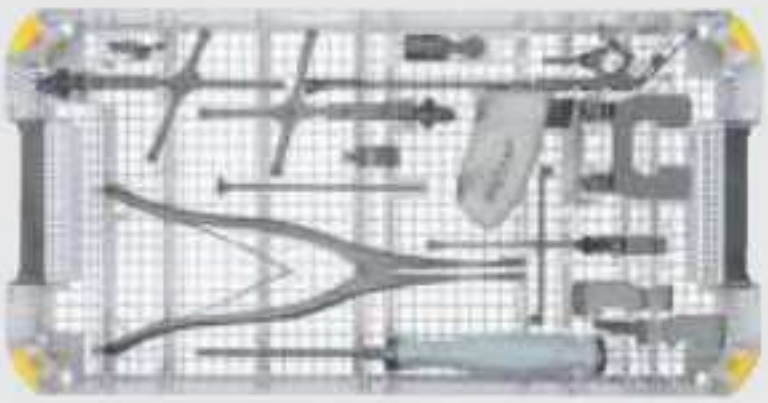
10.4 OrthoPilot® TKA AESCULAP® RESET® – IQ navigation instruments



OrthoPilot® TKA NAVIGATION INSTRUMENTS NP138		
NP139R	OrthoPilot® TKA TRAY NAVIGATION INSTR.	1
JA455R	LID FOR OrthoTray® DIN W/O HANDLE	1
FS604	OrthoPilot® STRAIGHT POINTER	1
FS633	OrthoPilot® PASSIVE TRANSMITTER (YELLOW)	1
FS634	OrthoPilot® PASSIVE TRANSMITTER (BLUE)	1
FS635	OrthoPilot® PASSIVE TRANSMITTER (RED)	1
NE358R	SCREW DRIVER BIT TORX T20 / AF3.5	1
NP619R	OrthoPilot® TRANSMITTER MOUNTING SLEEVE	3
NP620R	OrthoPilot® BICORTICAL SCREW 30MM	2
NP621R	OrthoPilot® BICORTICAL SCREW 35MM	2
NP622R	OrthoPilot® BICORTICAL SCREW 40MM	2
NP623R	OrthoPilot® BICORTICAL SCREW 45MM	2
FS626R	IQ OrthoPilot® TKA RB-ADAPTER MODULAR	1
NS320R	IQ NAVIGATED FEMORAL ALIGNMENT BLOCK	1
NQ958R	MIOS® Y-FOOTPLATE F/ALIGNMENT BLOCK	1
NS423R	IQ SCREW DRIVER SW3.5	1
TA020007	USER MANUAL FOR KNEE-INSTRUMENTS	1
TF149	GRAPHIC TEMPLATE F/NP139R (NP138)	1
NE750R	e.motion® PS/REV FEMUR-TIBIA-DISTRACTOR	1
NP609R	FEMOROTIBIAL GAP DISTRACTOR FOR NP604R	1
NP616R	BICORTICAL SCREW DRILL GUIDE 3.2/100MM	1
NP615R	BICORTICAL SCREW DRILL BIT 3.2MM DIA.	1
NP617RM	OrthoPilot® TIBIAL CHECKING PLATE MODIF.	1

Optional		
NM743	OrthoPilot® ELASTIC FOOT STRAP	1
NM769R	OrthoPilot® TRANSMITTER FOOT PLATE	1
NP281R	OrthoPilot® SCREW LENGTH GAUGE	1
NQ940R	MIOS® HANDLE F/TISSUE PROTECTION SLEEVE	1
NQ941R	MIOS® TISSUE PROT.SLEEVE F/RIGID BODY	1

10.5 OrthoPilot® TKA AESCULAP® RESET® – IQ navigation instrument Multitool, two-pin fixation



IQ SET NAVIG.INSTR.MULTI TOOL/MONOCORT. NP1000		
JA455R	LID FOR OrthoTray® DIN W/O HANDLE	1
NP1001R	IQ TRAY NAVIGATION INSTRUMENTS	1
TF277	PACKING STENCIL F/NP1001R (NP1000)	1
FS634	OrthoPilot® PASSIVE TRANSMITTER (BLUE)	1
FS635	OrthoPilot® PASSIVE TRANSMITTER (RED)	1
NS423R	IQ SCREW DRIVER SW3.5	1
FS640	OrthoPilot® TKA MULTI TOOL	1
FS636	OrthoPilot® PASS.CLICK TRANSMITTER YELLOW	1
NP609R	FEMOROTIBIAL GAP DISTRACTOR FOR NP604R	1
NE750R	e.motion® PS/REV FEMUR-TIBIA-DISTRACTOR	1
FS626R	IQ OrthoPilot® TKA RB-ADAPTER MODULAR	1
NP1016R	2-PIN TRANSMITTER FIXATION ELEMENT	2
NP1012R	PIN F/2-PIN TRANSM.FIXATI.D3.2MM WL70MM	4
NP1013R	PIN F/2-PIN TRANSM.FIXAT.D3.2MM WL120MM	2
NP618R	RB SCREW DRIVER ON MOTOR	1
TA015999	IFU INSTRUMENT SET NAVIGATION	1

Optional		
NP1018R	IQ ALIGNM.INSTR.F/FEMUR/TIBIA CUTT. GUIDE	1
TF272	GRAPHIC TEMPLATE F/NP1001R (NP1000)	1
TA014010	IFU FOR ALUMINIUM GRAFIC TEMPLATES	1
NP1017R	IQ NAVIGATION ADAPTER F/TIBIA ROTATION	1
NP1013R	PIN F/2-PIN TRANSM.FIXAT.D3.2MM WL120MM	1

Alternative		
NP605R	FEMUR-TIBIA-DISTRACT.FCPS W/FORCE CONTR.	1

AESCULAP® OrthoPilot® TKA

10 | INSTRUMENT SET OVERVIEW – OrthoPilot® TKA VERSION 6

10.6 OrthoPilot® TKA AESCULAP® RESET® – IQ navigation instrument Multitool, bicortical fixation

IQ SET NAVIG.INSTR.MULTI TOOL/BICORTICAL NP1002		
JA455R	LID FOR OrthoTray® DIN W/O HANDLE	1
NP1001R	IQ TRAY NAVIGATION INSTRUMENTS	1
TF278	PACKING STENCIL F/NP1001R (NP1002)	1
FS634	OrthoPilot® PASSIVE TRANSMITTER (BLUE)	1
FS635	OrthoPilot® PASSIVE TRANSMITTER (RED)	1
NS423R	IQ SCREW DRIVER SW3.5	1
FS640	OrthoPilot® TKA MULTI TOOL	1
FS636	OrthoPilot® PASS.CLICK TRANSMITTER YELLOW	1
NP609R	FEMOROTIBIAL GAP DISTRACTOR FOR NP604R	1
NE750R	e.motion® PS/REV FEMUR-TIBIA-DISTRACTOR	1
NP1013R	PIN F/2-PIN TRANSM.FIXAT.D3.2MM WL120MM	1
NP615R	BICORTICAL SCREW DRILL BIT 3.2MM DIA.	1
NP616R	BICORTICAL SCREW DRILL GUIDE 3.2/100MM	1
NP619R	OrthoPilot® TRANSMITTER MOUNTING SLEEVE	2
NP621R	OrthoPilot® BICORTICAL SCREW 35MM	2
NP622R	OrthoPilot® BICORTICAL SCREW 40MM	2
NP623R	OrthoPilot® BICORTICAL SCREW 45MM	2
NP624R	OrthoPilot® BICORTICAL SCREW 50MM	2
NP618R	RB SCREW DRIVER ON MOTOR	1
TA015999	IFU INSTRUMENT SET NAVIGATION	1

Optional		
NP1018R	IQ ALIGNM.INSTR.F/FEMUR/TIBIA CUTT. GUIDE	1
FS626R	IQ OrthoPilot® TKA RB-ADAPTER MODULAR	1
TF273	GRAPHIC TEMPLATE F/NP1001R (NP1002)	1
TA014010	IFU FOR ALUMINIUM GRAFIC TEMPLATES	1
NP1017R	IQ NAVIGATION ADAPTER F/TIBIA ROTATION	1
NQ941R	MIOS® TISSUE PROT.SLEEVE F/RIGID BODY	1
NQ940R	MIOS® HANDLE F/TISSUE PROTECTION SLEEVE	1

Alternative		
NP605R	FEMUR-TIBIA-DISTRACT.FCPS W/FORCE CONTR.	1

11 | SOFTWARE AND CONSUMABLES

11.1 OrthoPilot® Software

Software module	
FS238	OrthoPilot® Software TKA version 6

11.2 Disposables

Passive marker spheres	
FS616	OrthoPilot® DISPOS.PASSIVE MARKER STERILE
FS618SU	OrthoPilot® CAP SINGLE-USE MARKERS

11.3 Consumables

Instruments care oil	
JG600	Sterilit® I OIL SPRAY
JG598	Sterilit® I DRIP FEED OILER

NOTE

Prior to function checks, lubricate moving parts (e.g. joints, pusher components and threaded rods) with maintenance oil suitable for the respective sterilization process (e.g. for steam sterilization: AESCULAP® Sterilit® oil spray JG600 or Sterilit® drip lubricator JG598).

AESCULAP® OrthoPilot® TKA

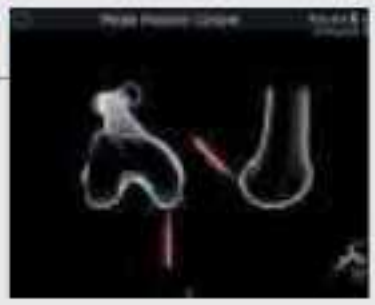
12 | OrthoPilot® TKA VERSION 6 SCHEMATIC PROGRAM SEQUENCE

12.1 OrthoPilot® TKA version 6 Tibia first with soft tissue management

01 
Selecting surgical options

02 
Entering patient data

03 
Entering operation data

04 
Registering medial posterior condyle

05 
Registering lateral posterior condyle

06 
Registering anterior cortex point

07 
Registering medial epicondyle (optional)

08 
Registering lateral epicondyle (optional)

09 
Registering medial tibia reference

10 
Registering lateral tibia reference

11 
Identifying tibial center

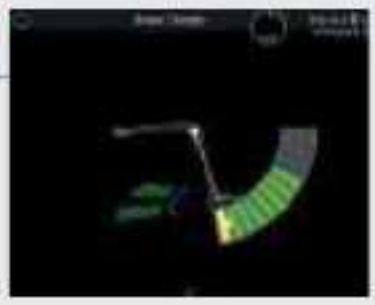
12 
Recording first tibial rotation reference (optional)

13 
Registering medial malleolus

14 
Registering lateral malleolus

15 
Registering anterior ankle

16 
Registering hip joint center

17 
Registering knee joint center

18 
Depiction of mechanical axis – pre-operative

19 
Planning tibia cut

20 
Recording tibia cut

21 
Registering distal and posterior condyles (condyle references)

22 
Optimizing anterior cortex point

23 
Recording extension gap

24 
Recording flexion gap

AESCULAP® OrthoPilot® TKA

12 | TKA VERSION 6 SCHEMATIC PROGRAM SEQUENCE

25 

Femoral planning

26 

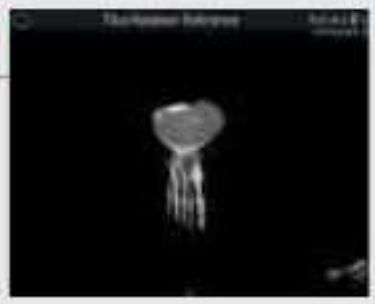
Planning distal femoral resection

27 

Registering femoral resection

28 

Positioning 4-in-1 cutting block

29 

Tibia rotation reference (optional)

30 

Tibia rotation navigation (optional)

31 

Depiction of mechanical axis – post-operative

32 

Surgery summary

AESCULAP® OrthoPilot® TKA

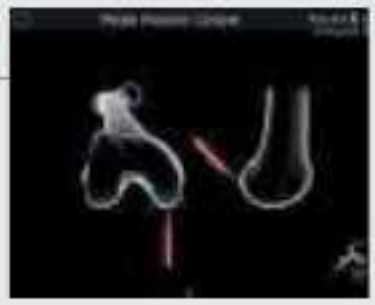
12 | TKA VERSION 6 SCHEMATIC PROGRAM SEQUENCE

12.2 OrthoPilot® TKA version 6 Femur first

01 
Selecting surgical options

02 
Entering patient data

03 
Entering operation data

04 
Registering medial posterior condyle

05 
Registering lateral posterior condyle

06 
Registering anterior cortex point

07 
Registering medial epicondyle (optional)

08 
Registering lateral epicondyle (optional)

09 
Registering medial tibia reference

10 
Registering lateral tibia reference

11 
Identifying tibial center

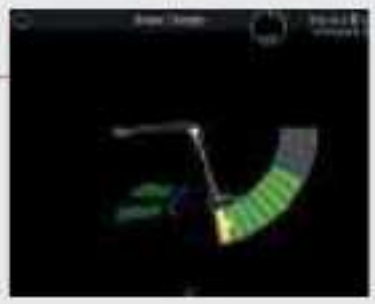
12 
Recording first tibial rotation reference (optional)

13 
Registering medial malleolus

14 
Registering lateral malleolus

15 
Registering anterior ankle

16 
Registering hip joint center

17 
Registering knee joint center

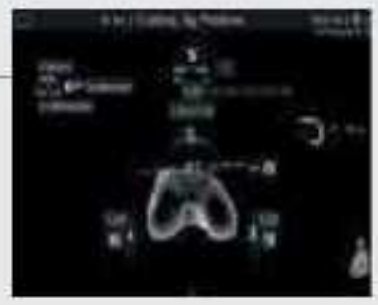
18 
Depiction of mechanical axis – pre-operative

19 
Recording Whiteside line

20 
Optimizing anterior cortex point

21 
Planning distal femoral resection

22 
Registering femoral resection

23 
Positioning 4-in-1 cutting block

24 
Planning tibial resection

AESCULAP® OrthoPilot® TKA

12 | TKA VERSION 6 SCHEMATIC PROGRAM SEQUENCE

25

Registering tibial resection

26

Tibia rotation reference (optional)

27

Tibia rotation navigation (optional)

28

Depiction of mechanical axis – post-operative

29

Surgery summary

NOTES

AESCULAP® – a B. Braun brand

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NDI-marker:
NDI | 103 Randall Drive | Waterloo | Ontario | Canada

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