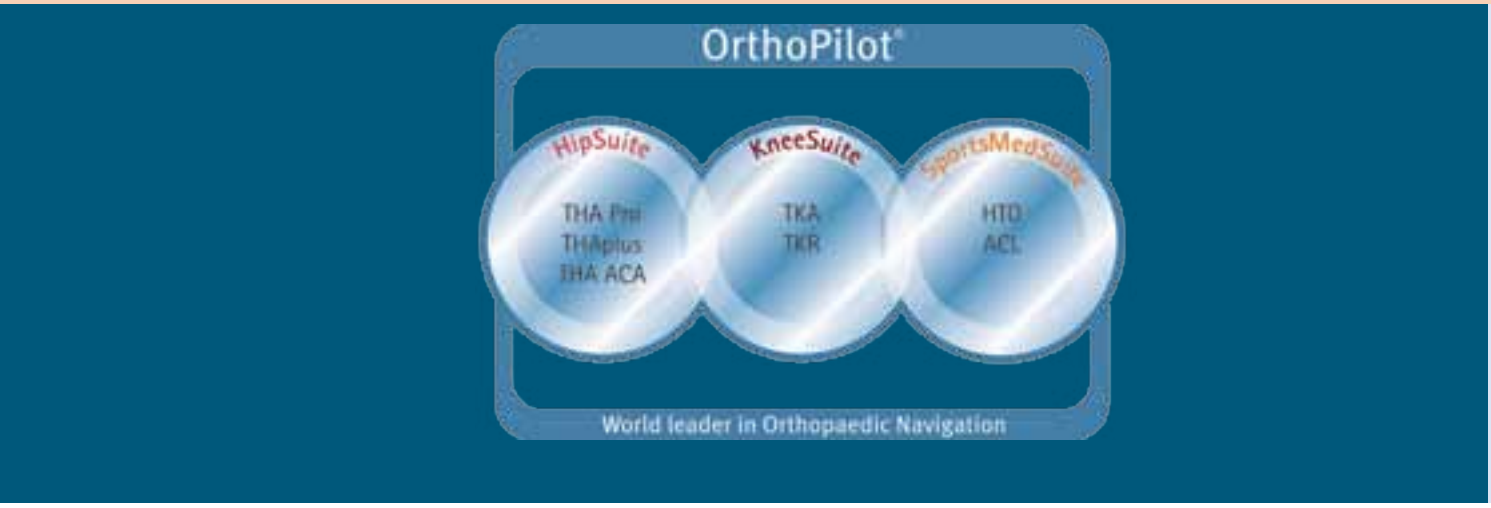
OrthoPilot®

OrthoPilot KneeSuite – TKA Smart 1.0 Surgical Technique
TKA Smart, Columbus®, VEGA System®

Aesculap Orthopaedics

AESCULAP®
Implant Systems

OrthoPilot® TKA – Smart



[1] Jenny JY, Clemens U, Kohler S, Kiefer H, Konermann W, Miehlke RK. Consistency of implantation of a total knee arthroplasty with a non-image-based navigation system: a case-control study of 235 cases compared with 235 conventionally implanted prostheses. J Arthroplasty. 2005 Oct;20(7):832-9.

[2] Jenny JY, Miehlke RK, Giurea A. Learning curve in navigated total knee replacement. A multi-center study comparing experienced and beginner centers. Knee. 2008 Mar;15(2):80-4. Epub 2008 Feb 11.

[3] Decking R, Markmann Y, Fuchs J, Puhl W, Scharf HP. Leg axis after computer-navigated total knee arthroplasty: a prospective randomized trial comparing computer-navigated and manual implantation. J Arthroplasty. 2005 Apr;(20(3):282-8.

[4] Seon JK, Song EK. Navigation-assisted less invasive total knee arthroplasty compared with conventional total knee arthroplasty: a randomized prospective trial. J Arthroplasty. 2006 Sep;21(6):777-82.

OrthoPilot®

The OrthoPilot system assists in the precise implantation of knee and hip endoprostheses.[1] Appropriate integration in the surgical workflow as well as minimal prolongation of operation time were essential criteria in the development of the OrthoPilot system.[2] At the same time, we focused on a navigation system that is non-traumatic for the patient. From the beginning, a method was developed that eliminates CTs and MRIs and the X-ray exposure or expenses that these entail, and requires the least possible amount of extra operation time.

- CT Scan not required
- Ergonomic instruments precisely aligned to the surgery
- User-friendly navigational flow integrates itself easily into the operation
- Intraoperative documentation with OrthoPilot
- Numerous international studies confirm significantly better alignment of implant
- Routinely used in over 600 hospitals worldwide
- Over 300 OrthoPilot publications worldwide [3, 4]

Indication and Contraindications

The system can be used in all cases where a arthroplasty of a knee is surgically indicated. Contraindications for these prostheses are listed in the documentation enclosed with the respective implants. The presence of excessive damage to the joint can make the determination of the joint center from kinematic data unreliable. If this is the case, the software automatically selects joint centers that are calculated redundantly from points scanned with sufficient precision. As this procedure cannot be carried out on the hip, the system can be used in such cases only if the operation-side hip joint is sufficiently mobile.

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Content

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1 | Instrument overview

1.1 General instruments

Drill, drill sleeve, screw length gauge

Drill, D=3.2 mm	**NP615R**
Drill sleeve	**NP616R**
Screw length gauge	**NP281R**

Tissue protection sleeve, bicortical screws, Rigid Body (RB) adapter

MIOS tissue protection sleeve	**NQ941R**
Bicortical screws	**NP620R–NP625R**
Rigid Body	**NP619R**

Pointer, straight

Pointer, straight	**FS604**

Tibia cut control plate

Tibia control plate	**NP617R**
Tibia control plate	**NP617RM**

Active transmitters

3 x	**FS601**

Passive transmitters

yellow	**FS633**
blue	**FS634**
red	**FS635**

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1 | Instrument overview

1.4 Specific instruments Columbus®

Femoral alignment block with foot plates

Standard	**NE324T**
MIOS	**NQ954R**
MIOS short	**NQ944R**
foot plates	**NE441R/NE442R**
Y foot plate	**NQ958R**

Tibial cutting guide

right	**NP596R**
left	**NP597R**
MIOS right	**NQ952R**
MIOS left	**NQ951R**

Distal femoral cutting guide

Standard	**NP598R**
MIOS	**NQ953R**

1.5 Specific instruments VEGA System® IQ

Femoral alignment block with foot plates

Alignment block	**NS320R**
Y foot plate	**NQ958R**

Tibial and distal femoral cutting guide with RB adapter, modular

Tibia & distal femur cutting guide	**NS334R**
RB adapter, modular	**FS626R**

4-in-1 Femoral cutting guide with RB adapter, modular

4-in-1 Femoral cutting guide	**NS582R**
	- NS588R
RB adapter, modular	**FS626R**

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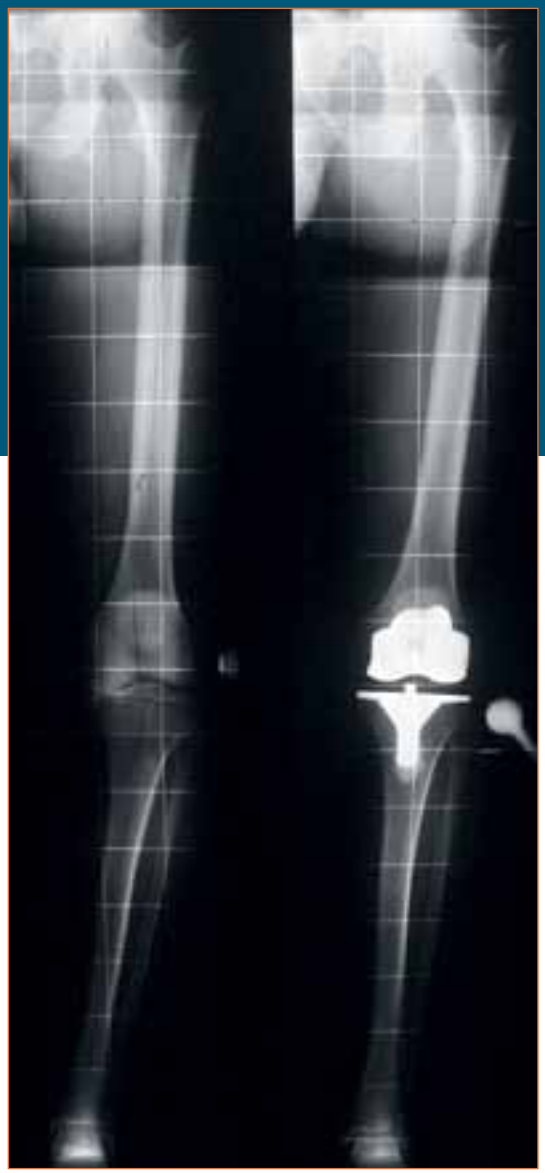
2 | Preoperative planning using radiographic images

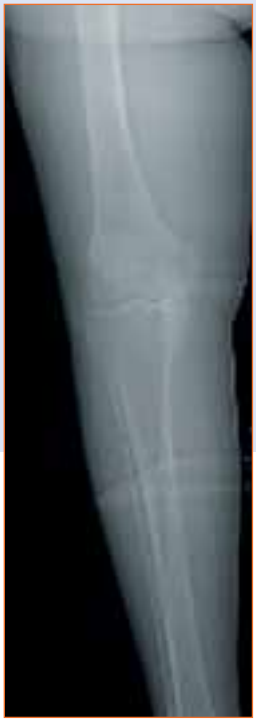


The OrthoPilot system and the TKA software can be used in all cases where total knee arthroplasty with a knee endoprosthesis is indicated.
There must be sufficient bone quality and hip joint mobility.

Note:

The corresponding notes in the respective surgical technique description, instruction for use and package inserts, in particular in the instruction for use for the OrthoPilot application software TKA Smart must be observed! IFU's can be found at www.aesculapimplantsystems.com

3 | Preoperative planning



Aesculap considers it necessary to carry out an adequate preoperative planning based on the basis of the following X-ray images:	Selected information which can be obtained on the basis of the X-ray images:
▪ Whole leg image in standing position	▪ Axis deviation
▪ Knee joint in an A/P projection	▪ Implant alignment, joint gap, ML implant size
▪ Knee joint in lateral projection	▪ Slope, joint gap in flexion, A/P implant size
▪ Tangential image of the patella	▪ Rotational position, patella position

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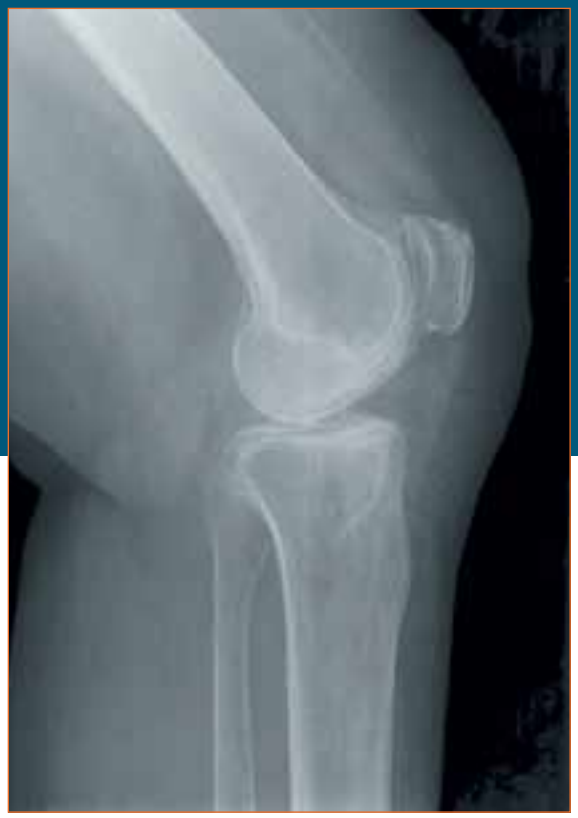

The analysis of the need for a full knee endoprosthesis is essential in the preoperative planning. In addition to the standard radiological examinations, the surgeon should take the following points into consideration before performing a knee endoprosthesis surgery:

- Soft tissue situation
- Functionality of the extensor mechanism
- Bone preservation
- Restoration of good axis orientation
- Functional stability
- Restoration of the joint line

The surgeon can obtain the following information when analyzing the X-ray images with the help of the X-ray templates of the Aesculap prosthesis systems Columbus®:

- Angle between anatomic and mechanical femur axis
- Resection height
- Implant size

4 | Preparation of the patient

Positioning and sterile draping of the patient is carried out according to the standard procedures which are also applied in the conventional technique. Aesculap recommends using a leg holder, which facilitates leg control during the various phases of the operation.
In order to record the points to be registered and to carry out all the necessary bone cuts, it is necessary to change the leg position several times. The leg holder enables the knee position to be varied between full extension and full flexion.

TIP

To facilitate mobilization of the quadriceps, the knee should be brought to 100° flexion prior to activating the tourniquet. If a pad is used, make sure that it does not hinder full circulation of the hip joint required for registering the femoral head center.

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5 | OrthoPilot setup and transmitter position

5.1 OrthoPilot Positioning

When positioning the OrthoPilot, ensure that the physician has an unobstructed view of the screen at all times, that the device is positioned on the side opposite the leg to be operated on, and that the camera is ideally at a distance of approx. 2 m (1.8 - 2.2 m) from the transmitters.
In many cases, it has proven beneficial to position the camera at shoulder height on the opposite side of the patient and aligned at approx. 45° to the OP field.

TIP

Point the laser pointer integrated in the handle of the camera at the knee joint to be operated on while the leg is in approx. 90° flexion. The camera alignment can be adjusted at any stage of the operation, except during determination of the hip center.

5.2 Femoral transmitter

TIP

The following applies in general: the transmitter should be positioned in such a way that it is visible for the camera during the entire operation.
The femur transmitter must be fixed on the femur with the help of 4.5 mm cortical screws and the Rigid Body (RB) NP619R at about 10 cm to the joint line. The bicortical screw is pre-drilled by using a 3.2 mm drill NP615R through the drill sleeve NP616R; then, the length of the necessary bicortical screw can be determined with the help of the measuring instrument NP281R by hooking on the opposite cortical and reading the dial. The Rigid Body NP619R is pushed forward by the tissue protection drill sleeve, brought into contact with the bone, and then one of the bicortical screws NP620R - NP625R is introduced first by power and the last turns are performed using a manual screwdriver. The transmitter adapter must point to the head of the hip, inclined to the medial. It is recommended to test the secure fit.

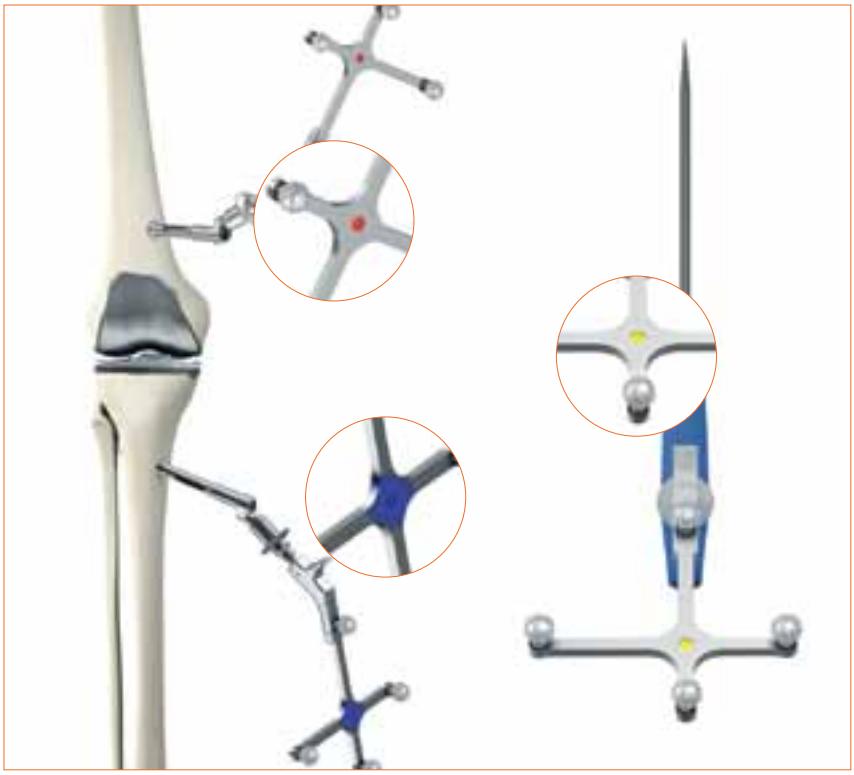
TIP

The tip of the pointer with a length of about 10 cm can serve as a guide for the distance to the joint for placement of transmitters.

5.3 Tibial transmitter

Through a separate, approximate 1 cm long incision, about 10 cm distal to the joint line, a RB NP619R is fixed to the tibia after pre-drilling with the 3.2 mm drill NP615R through the drill sleeve NP616R and after determining the length of the bicortical screw with the measuring instrument NP281R. The last turns of the screw are performed with a manual screwdriver.

The passive transmitter (FS635) marked in red or the respective active transmitter (FS601, red port) is attached to the femoral Rigid Body (RB) adapter, the passive transmitter (FS634) marked in blue or the respective active transmitter (FS601, blue port) - on the tibial Rigid Body (RB) adapter. The yellow passive (FS633) or the respective active transmitter (FS601, yellow port) is attached to the respective instruments required at each stage.



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6 | Entering patient-related information

Entering hospital-related data
Name of the surgeon
Name of the hospital
Entering patient data
First name
Last name
Date of birth
Gender

Side
left
right
Implant
Columbus®
VEGA System®
Tools set
Standard
MIOS
IQ
Tracking technology
Active
Passive

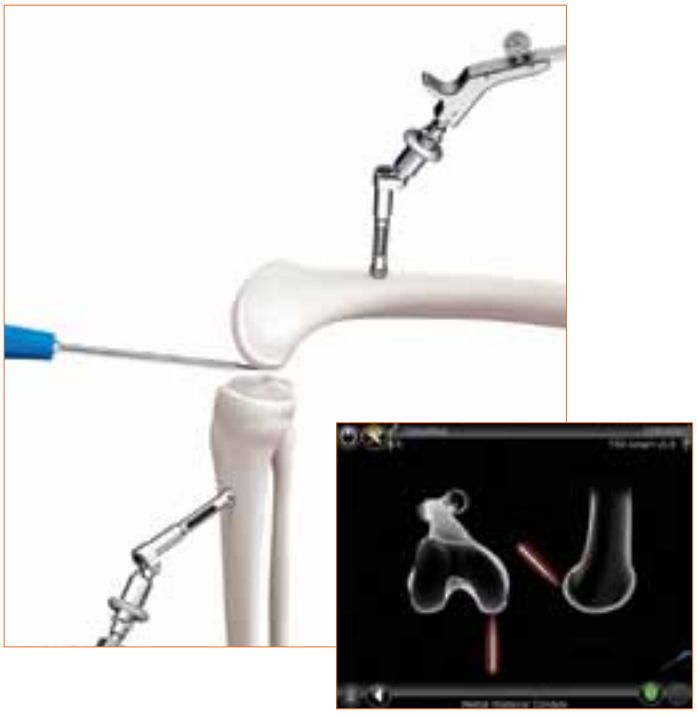
7 | Anterior cortical point and posterior condyle line

7.1 Recording the anterior cortical point

This point is located at the place where the anterior shield ends proximally. In the medio-lateral direction, the most anterior point should be palpated.
The proposal for the size of the femoral component is calculated on the basis of the distance between this point and the posterior condyle. This point is used later on to determine whether there is a danger of cutting into the anterior cortex.

7.2 Recording the medial and lateral posterior condyle

The tip of the pointer is placed in the middle of the posterior medial condyle. The point selected is the one lying furthest posterior, i.e. the one with the greatest distance from the anterior femoral cortex. The recording on the lateral side is made in the same manner.



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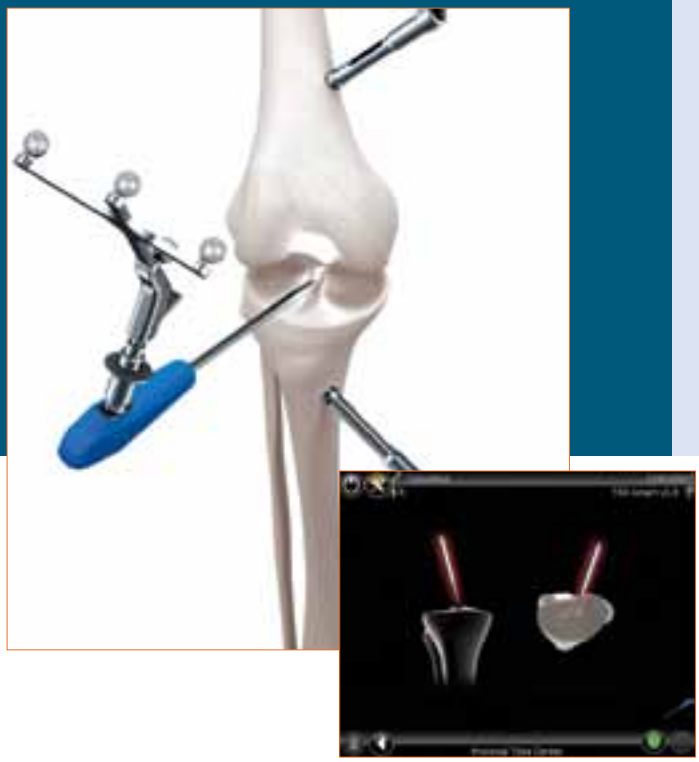
8 | Determination of the proximal tibia center

In this step, the center of the anterior edge of the anterior cruciate ligament has been recorded. If there is no cruciate ligament or in the case of degenerative changes, the following point is found:

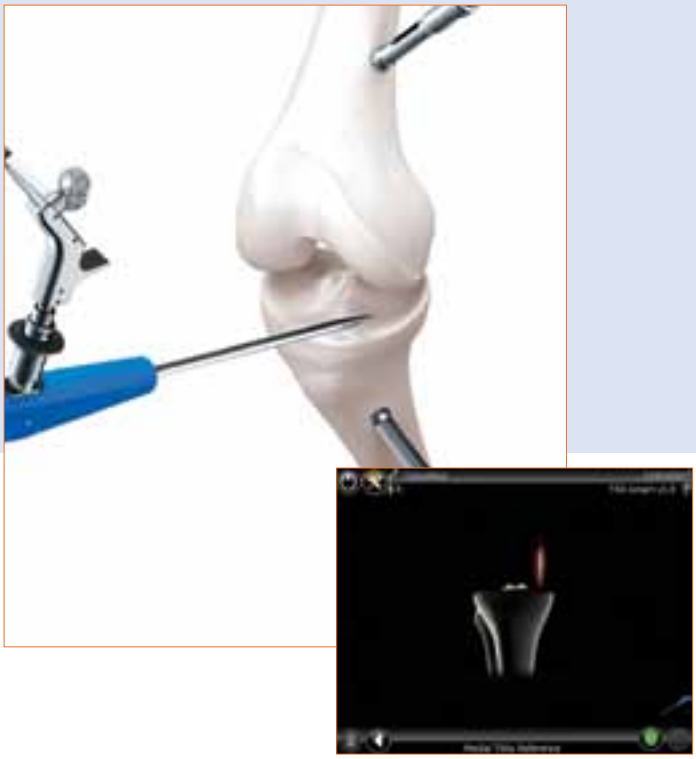
- in the middle of the medial-lateral diametral line of the tibial head,
- at the transition from the first to the second third of the anterior/posterior diametral line of the tibia head, measured from the anterior edge.



9 | Palpation of the tibial reference points

9.1 Reference for the medial cutting height indicator

In this step, the reference point for the medial cutting height indicator is recorded.
It is recommended to use significant landmarks for palpation such as, for example, the deepest points of the defects or the surface of the joint.

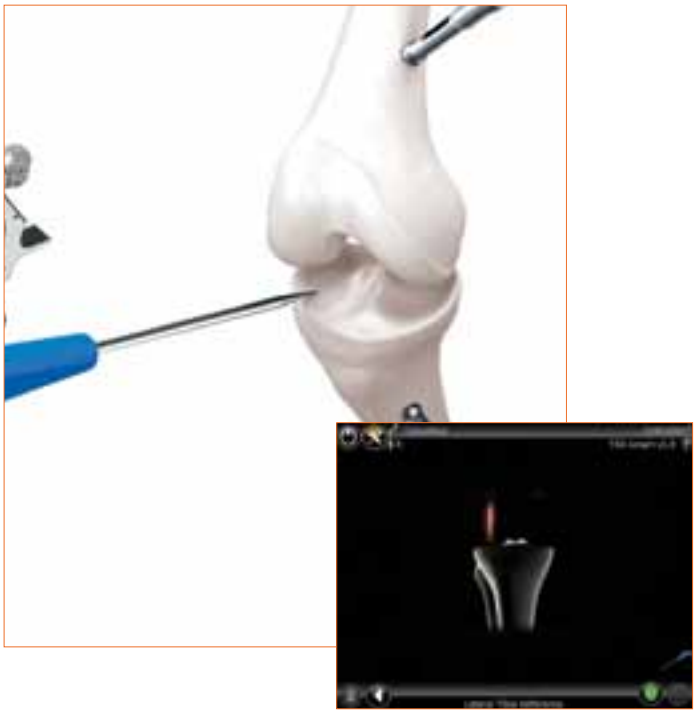


9.2 Reference for the lateral cutting height indicator

In this step, the reference point for the lateral cutting height indicator is recorded.
It is recommended to use significant landmarks for palpation such as, for example, the deepest points of the defects or the surface of the joint.

TIP

Optionally the software can be triggered in such a way that only one reference point is requested and palpated.



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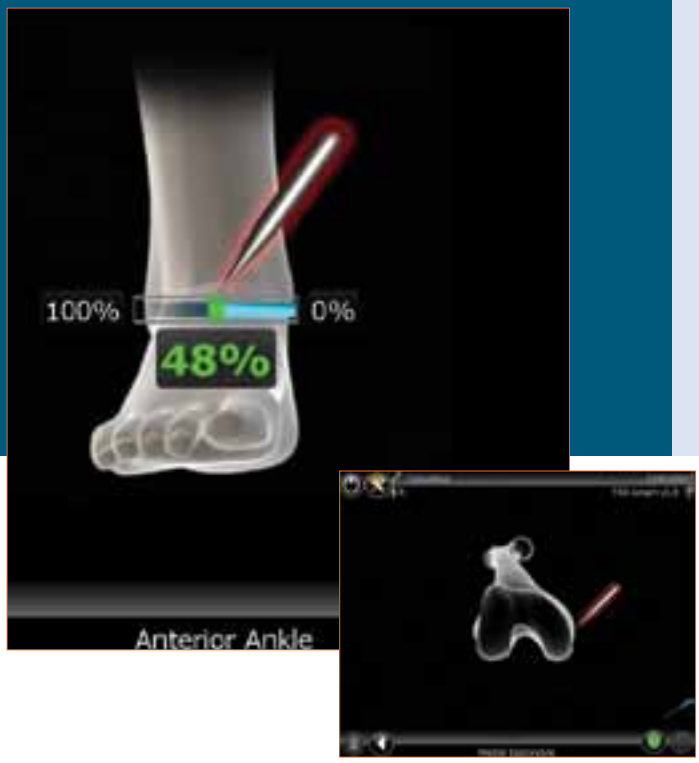
10 | Recording the epicondylar line – **optional**

Next, the epicondylar line is recorded by palpating the medial and lateral epicondyle. In a later program step, the user can decide whether to use the epicondylar line or the connecting line between the posterior condyles as reference line for rotational alignment of the femoral component of the implant.

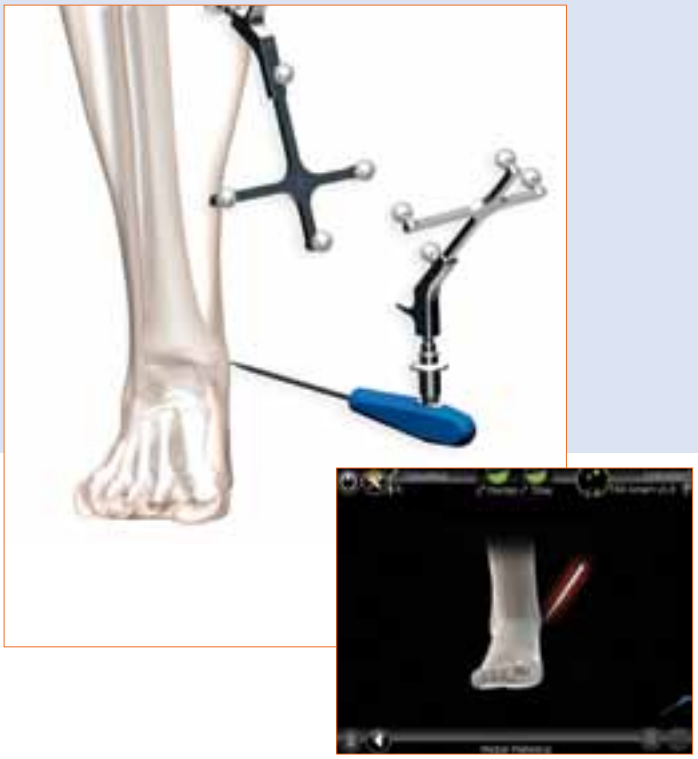


The tip of the pointer is placed first on the medial, then on the lateral epicondyle. The recording is made in each instance by pressing the right pedal.

11 | Ankle joint palpations

11.1 Medial and lateral malleolus

The pointer is placed at the center of the medial malleolus and the respective point is recorded using the right pedal. The recording on the lateral side is made in the same manner.

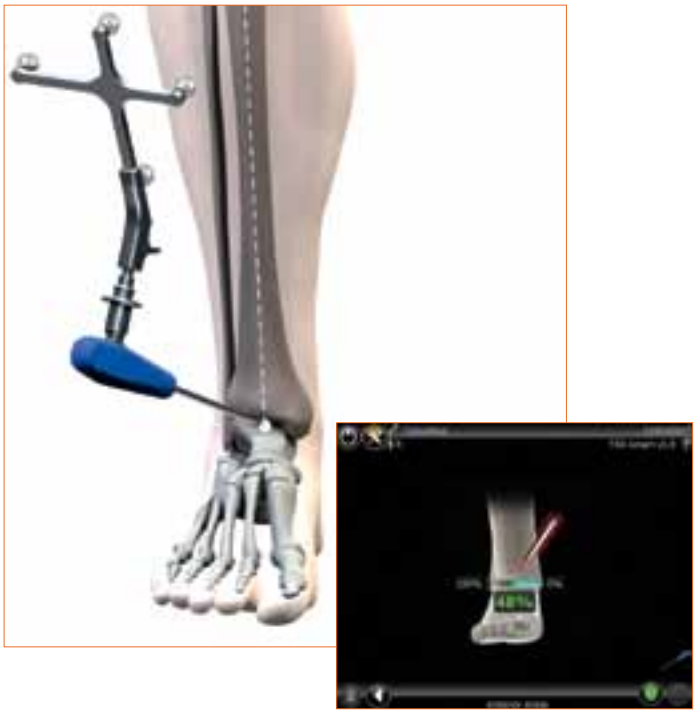


11.2 Anterior ankle joint point

For the recording, the pointer is placed at the anterior edge of the distal tibia as close as possible to the ankle joint gap. The following step is displayed: 'Anterior ankle joint point'. This palpation point should lie on the central tibial axis immediately adjoining the ankle joint center. It should be palpated there (as indicated by the white point). The screen display helps the surgeon to find the anterior ankle joint point by means of percentage indicator. The palpation point of the medial malleolus is taken as original of the display with a green safety area around 48% +/-5.

TIP

The second metatarsus or the extensor hallucis longis tendon can be used as a reference.



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12 | Registration of the hip joint center

The start screen for registration of the hip joint center is displayed.
Only when the leg is not moving, an upward pointing arrow appears and the data entry can start with the movement of the femur in the 12 o'clock direction.

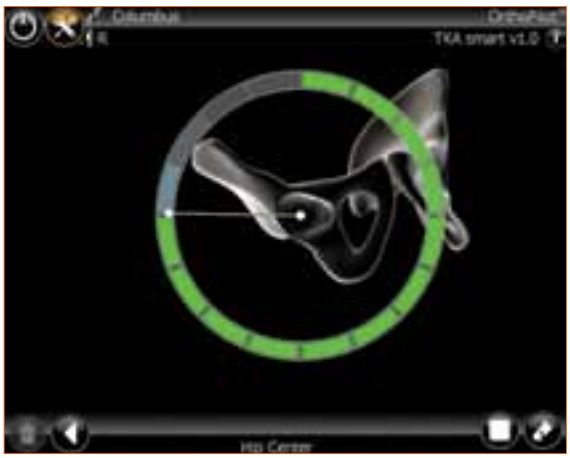
TIP
The circular movement, which is described, can be performed in a clockwise or counterclockwise direction depending on the physician's preference.

The femur is moved in such a way, so that the white point is moving over the fields arranged in a circle. As soon as sufficient measurement data for determining the femoral hip center have been registered, the program automatically moves to the next step.

In the case of a restless or too large movement, the messages 'Incorrect data' or 'Too wide movement' may appear and the movement must be repeated.

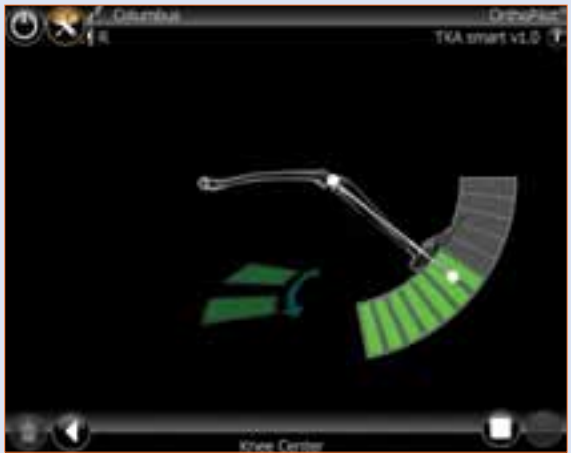
TIP
Special attention should be paid to:

- Visibility of the femur transmitter during the entire movement cycle
- Unrestricted freedom of circular movement (no obstruction by holding and fixing equipment)
- Avoiding transmission of force via the femur to the pelvis
- Avoiding any pelvic movement (responsibility of the surgeon; if this cannot be avoided, alternative determination of hip center, achieved via longpress of right footswitch can be performed. This would require an additional RB fixed to the iliac crest.)
- Avoidance of a hip flexion angle > 45°



13 | Determination of the knee joint center

In this step, the movement of the transmitter at the femur is tracked in relation to the transmitter at the tibia, and the center of the knee joint is thus determined.
The message 'knee center' is displayed on the screen. By pressing the right pedal, determination of the knee joint center is started. Flexion and extension movements are carried out with the leg. For this, the leg should be grasped with one hand under the heel. In order to coordinate the actual movement with the display on the screen, it is recommended to start the movement with the knee in approximately 90° flexion position.
Rotation of the tibia is not mandatory. Nevertheless, rotation at 90° flexion may be carried out to increase accuracy as soon as two arrows are displayed on the screen. Filled arrows indicate that the data were recorded. As soon as sufficient measurement data have been recorded, the software automatically moves on to the next program step. If the maximum range of movement was repeatedly covered (even without inward or outward rotation), the next step can optionally be called up by the user by pressing the right pedal.



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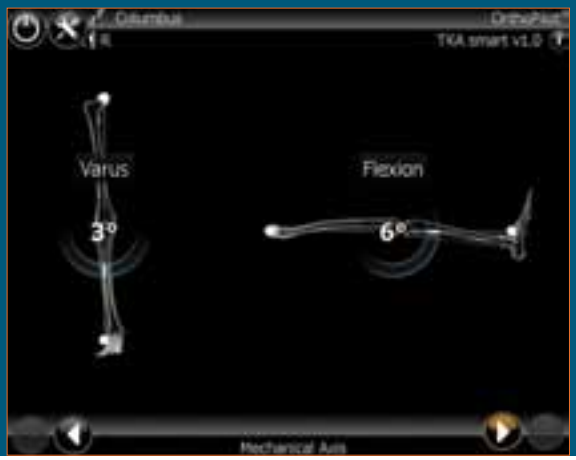
14 | Representation of the mechanical leg axis

In the following step, the registered axis situation is displayed in coronal and in sagittal view. The axis situation is displayed dynamically while the relationship between the mechanical tibial axis and the mechanical femoral axis is calculated in a real-time situation. The system thus enables dynamic goniometry of the knee joint, including specification of the current axis deviation or flexion position within the scope of movement.



TIP

This step can be used as a plausibility check of the abnormal axis position in various flexion positions of the leg, and also permits preliminary conclusions to be drawn regarding the ligament situation by applying varus and valgus stress.

Note:

For the Femur First technique, please see Chapter 21.

15 | Resection of the tibia plateau

Depending on which leg is being operated on, the tibial cutting block or, respectively the modular RB adapter of the femoral cutting guide (VEGA System® IQ) is attached to the corresponding transmitter. The exact resection height in relation to the bones of the medial and lateral (program steps 'Medial tibia reference' or 'Lateral tibia reference') reference points of the tibia, can be determined on a proximal or distal basis through the movement of the cutting block. The tibial cutting block can be navigated on the basis of the desired varus/valgus and slope value in relation to the mechanical axis. Aesculap recommends 0° posterior slope for its prosthesis systems, having 3° built into the polyethylene insert.

The tibial cutting guide is initially fixed from the anterior side using two headless pins. The cutting guide can now still be adjusted via the available pin holes, e.g. for a staggered cut if this is required.

The block is finally fixed at the desired set resection height, slope and varus/valgus alignment using an additional pin with a medially or laterally inclined head. Resection can now be performed.

Columbus®

TIP

In order to avoid contamination of the marker spheres on the passive transmitters, it is advisable to either remove the transmitters or to cover them appropriately until resection has been completed.

VEGA System®

TIP

In many cases it is beneficial first to adjust the anterior/posterior slope and the cutting height and then correct the varus/valgus around the anterior placed pin in order to be able to get closer to the desired position iteratively.

Columbus MIOS®

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16 | Reassessing the tibial resection

The tibia control plate NP617R or NP617RM with attached transmitters serves for reassessing and recording the tibial resection.
The actual orientation and position of the resection surface to the mechanical axis with respect to the varus/valgus angle and the tibial slope is displayed on the screen.
The data recorded here using the right pedal are used for further calculations, and it is therefore imperative to record this value again if resection of the tibia is repeated.

17 | Condyle recording

The distal and posterior condyles are recorded with the help of the corresponding orientation block with foot plates which must be in contact with both the distal as well as the posterior condyles (4-point contact). The alignment in the sagittal plane is displayed on the right half of the screen. The data capture should take place when the block is located in the sagittal plane perpendicular to the mechanical femur axis (i.e. the display on the screen has a slope of about 0°).

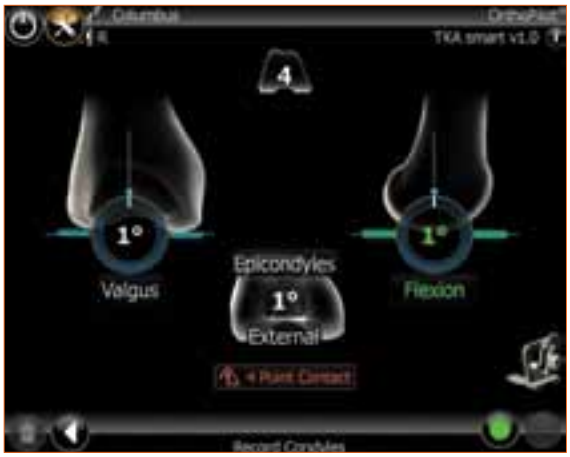
When the epicondyles have been palpated (optional), the angle between the trans-epicondyle line and the posterior condyle line, which is known over the foot plates in contact with the posterior condyles, is displayed in the middle of the screen. If this value is not plausible, it is recommended to perform again the palpation of the epicondyles.

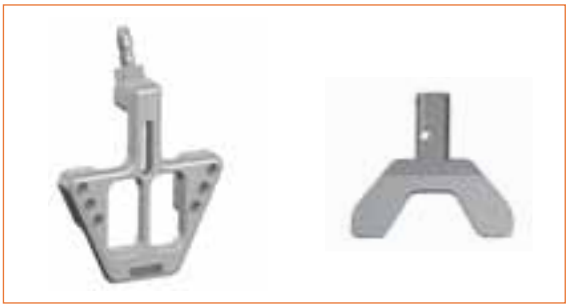
Columbus®

TIP

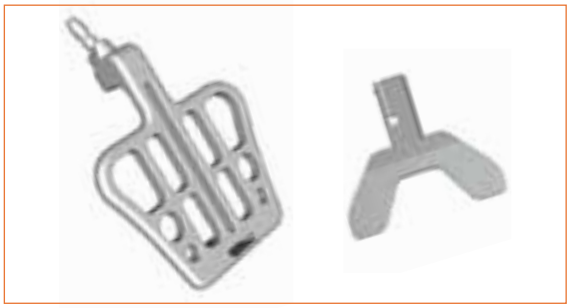
The 4-point contact is essentially important!
The following items are based on it:

- the proposal for the femur component size
- the display of the gap values, and the flexion
- the cutting height display for the distal and posterior femur resection
- the rotation display for the femur component





Columbus MIOS®



VEGA System®

OrthoPilot® TKA – Smart

18 | Optimization of anterior cortex

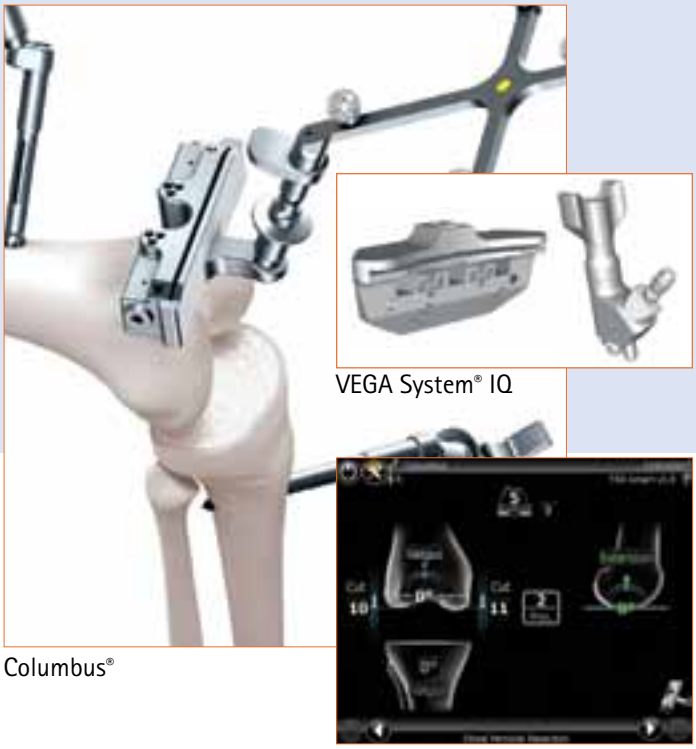
After the distal and posterior condyles have been recorded, an optimization of the anterior points on the femur with the pointer FS604 and the respective transmitter takes place. Proceed with the pointer tip on the anterior stem in proximal or distal direction until the two value fields show the same numbers.
The value field that is distal to the femur component shows the size of the femur implant in the AP direction.
The value field above the femur component shows the size of the femur implant in the proximal/distal direction.

The blue arrows show in what direction the pointer has to be moved in order to obtain optimal palpation of the anterior point with respect to the A/P and the proximal-distal implant size.

19 | Distal femur resection, control and rotational alignment

19.1 Distal femur resection

The distal femur resection block or the modular RB adapter of the femoral cutting guide (VEGA System®) is fitted with the corresponding transmitter (FS633 passive or FS601 active, yellow port). The precise resection height in relation to the bony reference points palpated on the distal femoral condyles medially and laterally is determined by moving the cutting guide in a proximal or distal direction. The target values are those which correspond with the the distal thickness of the respective femoral implant. If these values are reached the color of the ellipses in which the values are displayed, change to green.
The size of the respective femoral implant is indicated in the upper central part of the screen. Additionally the deviation from the joint level measured during the step 'condyle reference', here for example 0 mm proximally, is indicated.



VEGA System® IQ

Columbus®

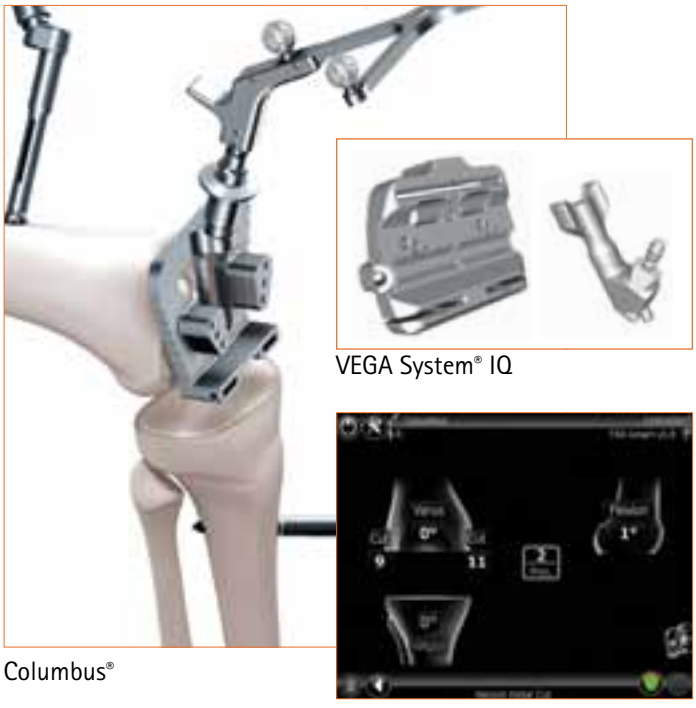
TIP

In order to avoid contamination of the marker balls (passive only) on the transmitters, it is advisable to either remove the transmitters or to cover them appropriately until resection has been completed.

The femoral cutting guide is fixed from the anterior side using two headless pins. The cutting guide can now be adjusted via the available pin holes (in 2 mm steps). When the desired resection height has been set, the cutting guide is additionally fixed medially and laterally via oblique headed pins, and the resection can be performed.

19.2 Reassessing the distal resection

After reassessing the distal femur resection using the corresponding femur orientation guide (Columbus®) or, respectively the corresponding 4-in-1 cutting guide with modular RB adapter (VEGA System), the rotational adjustment and the A/P positioning is performed.



VEGA System® IQ

Columbus®

19 | Distal femur resection, control and rotational alignment

19.3 Setting the rotational alignment

The rotational alignment is set with the corresponding femur orientation (Columbus®) guide or with the 4-in-1 cutting guide (VEGA System® IQ).

The femoral orientation guides can be aligned according to the favored value. After the desired position has been reached, the two holes for the fixation pins of the 4-in-1 cutting block is performed through the marked holes corresponding to the size S, M or L (Columbus®). The orientation guide can be removed and the 4-in-1 cutting guide can be fixed medially and laterally in the two prepared holes with the help of oblique pins. After that the cuts can be performed in the order anterior, posterior followed by the chamfer cuts.
The 4-in-1 cutting guides with RB adapter (VEGA System) can be fixed directly after the desired rotational position has been reached and the cuts can be performed in the order anterior, posterior, followed by the chamfer cuts. After completing resections implantation can now be performed at first with trial implants and then with the final implants.

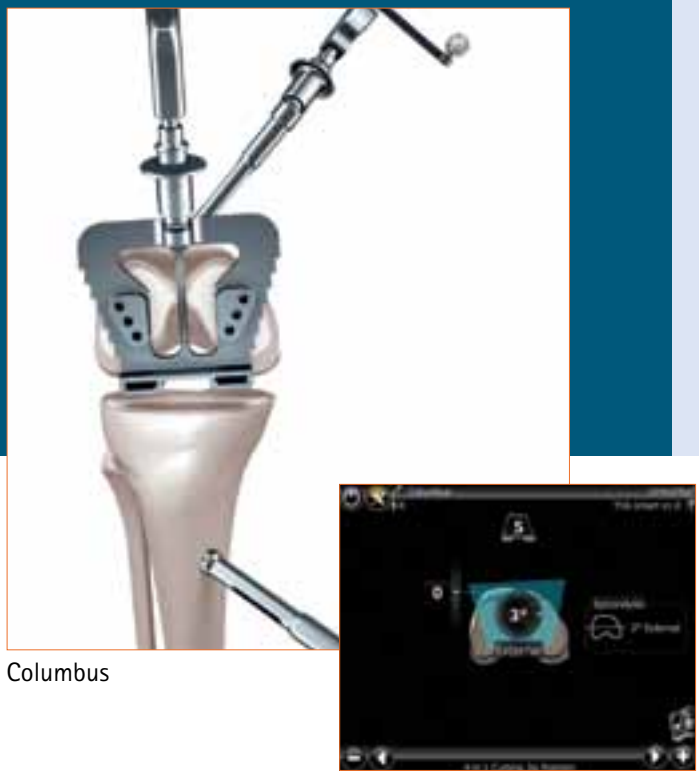
Note:

The instrumentation and the assembly of the implants take place as described in the following manual surgical techniques:

Columbus MIOS	**DOC620**
VEGA System IQ	**DOC1033**

TIP

The rotation value is displayed thereby in relation to the recorded posterior condyles.
At this point, both an adjustment to the palpated epicondyles (optional), (information in the middle of the screen right part) and a visual examination of the rotation position with respect to the Whiteside line can be performed.

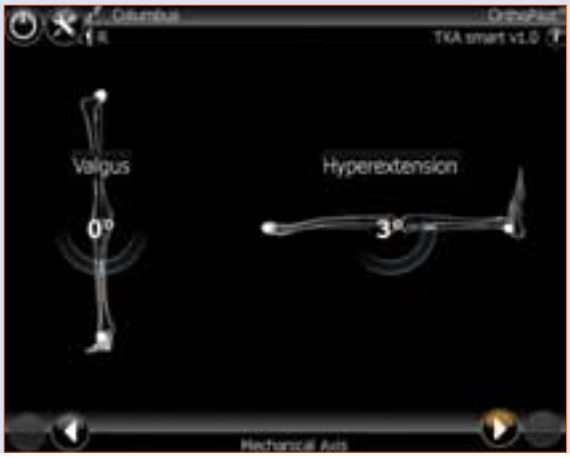


Columbus

VEGA IQ

20 | Mechanical axis

The mechanical axis achieved postoperatively (varus/valgus angle), as well as the maximum possible extension of the leg can already be checked using trial implants, and at the end using the final implant. A documented result of the operation is thus provided, which can if desired be attached to the patient file.



OrthoPilot® TKA – Smart

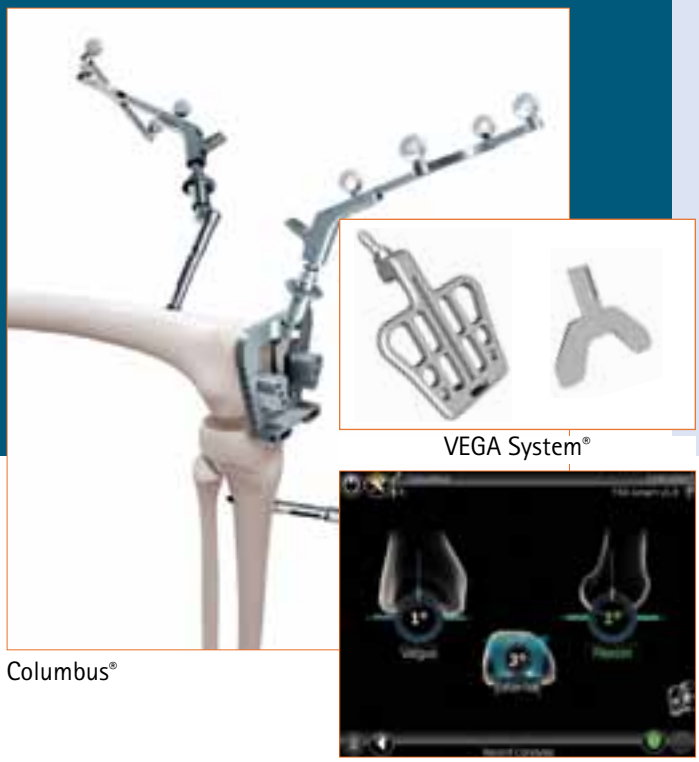
21 | Femur First technique

Note:

Please follow all steps up to and including Chapter 14.

21.1 Condyle recording

The distal and posterior condyles are recorded with the help of the corresponding orientation block with foot plates which must be in contact with the distal condyles. The alignment in the sagittal plane is displayed on the right half of the screen. The data capture should take place when the block is located in the sagittal plane perpendicular to the mechanical femur axis (i.e. the display on the screen has a slope of about 0°). The angle between the posterior condyle line and the orienting block is displayed in the middle of the screen.

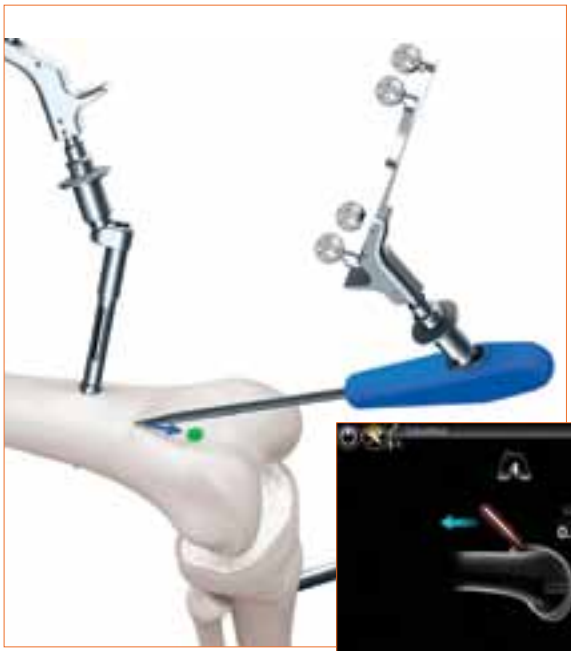


Columbus®

VEGA System®

21.2 Optimization of anterior cortex

After the distal condyles have been recorded, an optimization of the anterior points on the femur with the pointer FS604 and the respective transmitter takes place. Proceed with the pointer tip on the anterior stem in proximal or distal direction until the two value fields show the same numbers. The value field that is distal to the femur component shows the size of the femur implant in the AP direction.
The value field above the femur component shows the size of the femur implant in the proximal/distal direction.
The blue arrows show in what direction the pointer has to be moved in order to obtain optimal palpation of the anterior point with respect to the A/P and the proximal-distal implant size.



21.3 Distal femur resection

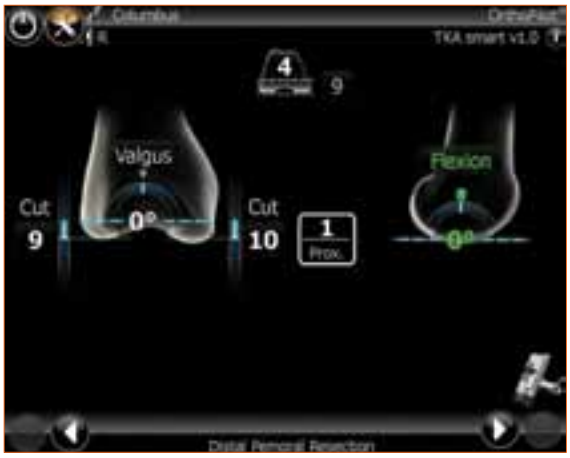
The distal femur resection block or the modular RB adapter of the femoral cutting guide (VEGA System® IQ) is fitted with the corresponding transmitter (FS633 passive or FS601 active, yellow port). The precise resection height in relation to the bony reference points palpated on the distal femoral condyles medially and laterally is determined by moving the cutting guide in a proximal or distal direction. The target values are those which correspond with the distal thickness of the respective femoral implant. The size of the respective femoral implant is indicated in the upper central part of the screen. Additionally the deviation from the joint level measured during the step 'condyle reference', here for example 1 mm proximally, is indicated.

TIP

In order to avoid contamination of the marker balls (passive only) on the transmitters, it is advisable to either remove the transmitters or to cover them appropriately until resection has been completed.

The femoral cutting guide is fixed from the anterior side using two headless pins. The cutting guide can now be relocated via the available pin holes (in 2 mm steps). When the desired resection height has been set, the cutting guide is additionally fixed medially and laterally via oblique headed pins, and the resection can be performed.

Columbus®



Columbus MIOS®

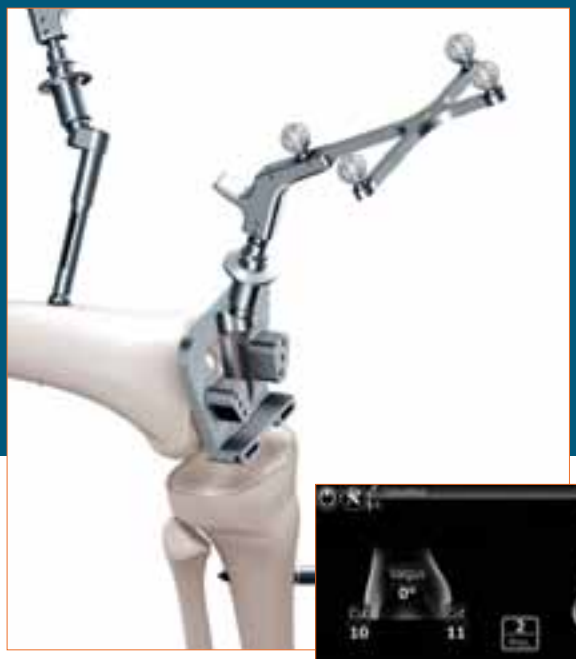
VEGA System® IQ

OrthoPilot® TKA – Smart

21 | Femur First technique

21.4 Reassessing the distal resection

After reassessing the distal femur resection using the corresponding femur orientation guide or, respectively the corresponding 4-in-1 cutting guide with modular RB adapter (VEGA System®), the rotational adjustment and the A/P positioning is performed.



Columbus®

Columbus MIOS®

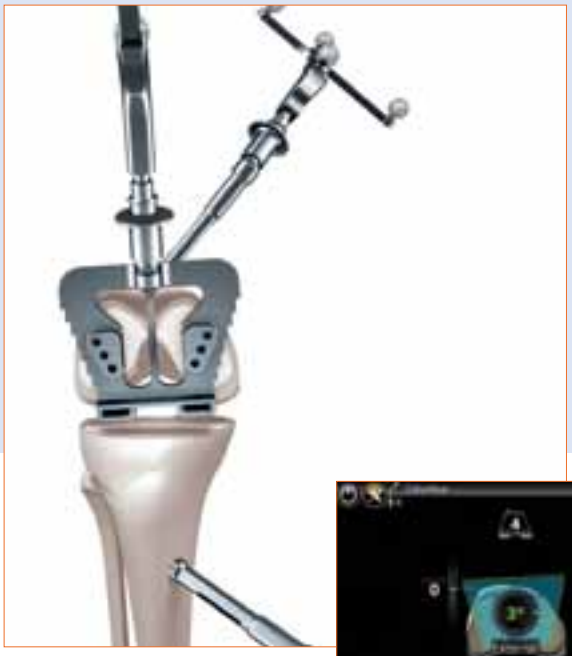
VEGA System® IQ

21.5 Setting the rotational alignment

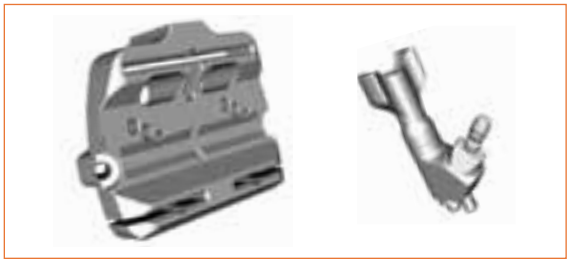
The rotational alignment is set with the corresponding femur orientation guide (Columbus®) or with the 4-in-1 cutting guide (VEGA System®).

The femoral orientation guides can be aligned according to the favored value. After the desired position has been reached, the two holes for the fixation pins of the 4-in-1 cutting block is performed through the marked holes corresponding to the size S, M or L (Columbus). The orientation guide can be removed and the 4-in-1 cutting guide can be fixed medially and laterally in the two prepared holes with the help of oblique pins. After that the cuts can be performed in the order anterior, posterior followed by the chamfer cuts.

The 4-in-1 cutting guides with RB adapter (VEGA System IQ) can be fixed directly after the desired rotational position has been reached and the cuts can be performed in the order anterior, posterior, followed by the chamfer cuts.



Columbus®



VEGA System®

TIP

The rotation value is displayed thereby in relation to the recorded posterior condyles. The femoral orientation guide will turn to green when reaching the same rotational position as preselected in the condyle reference step. An additional visual examination of the rotational position to the Whiteside line is possible at any time.

Note:

After preparation of the femur, the procedure is continued by following the steps described in chapters 15–16. The final display and reassessment of the postoperative mechanical leg axis is analogous to chapter 20 of the tibia first technique.

Note:

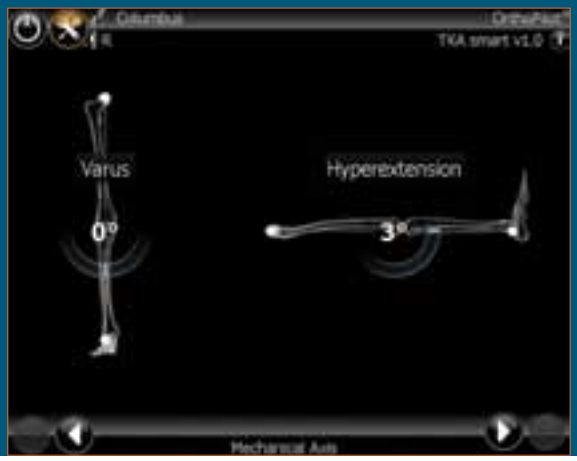
The instrumentation and the assembly of the implants take place as described in the following manual surgical techniques:

Columbus MIOS	**DOC620**
VEGA System	**DOC1033**

OrthoPilot® TKA – Smart

22 | Mechanical axis

The mechanical axis achieved postoperatively (varus valgus angle), as well as the maximum possible extension of the leg can be checked using trial implants, and at the end using the final implant. A documented result of the operation is thus provided, which can if desired be attached to the patient file.



23 | Instrument set overview OrthoPilot® TKA Columbus®

23.1 ST0127 – Active transmitter technology

ST0006 – Optional: MIOS set

OrthoPilot TKA active instruments

Tray 1

1	NP601P	storage periph. active
1	JF213R	1/1 size perf basket 485 x 253 x 76 mm
1	NP615R	bicortical screw drill bit 3.2 mm dia.
1	KH398R	screw length gauge
1	NP616R	bicortical screw drill guide 3.2/100 mm
1	NP618R	RB screw driver on motor
3	NP619R	transmitter mounting sleeve
2	NP620R	bicortical screw 30 mm
2	NP621R	bicortical screw 35 mm
2	NP622R	bicortical screw 40 mm
2	NP623R	bicortical screw 45 mm
2	NP624R	bicortical screw 50 mm
2	NP625R	bicortical screw 55 mm
1	JF511	cloth f. lining deep containers
3	FS601	active transmitter (ir)

OrthoPilot TKA instruments

Tray 2

1	NP603P	storage implant. instr
1	JF213R	1/1 size perf basket 485 x 253 x 76 mm
1	FS604	straight pointer
1	NP617R	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	universal positioning gears
1	NM769R	transmitter foot plate
2	NM743	elastic foot strap
1	JF511	cloth f. lining deep containers

Columbus MIOS instrumentation

Tray 1

1	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 485 x 253 x 106 mm
1	JF511	cloth f. lining deep containers
1	TE894	packing stencil F/NQ935P+NQ937P (NE340)

OrthoPilot® TKA – Smart

23 | Instrument set overview OrthoPilot TKA Columbus®

23.2 ST0298 – Passive transmitter technology

ST0006 – Optional: MIOS set

OrthoPilot TKA passive instruments

Tray 1

1	NP169P	tray periph. passive
1	JF213R	1/1 size perf basket 485 x 253 x 76 mm
1	JF511	cloth f. lining deep containers
1	FS633	passive transmitter (yellow)
1	FS634	passive transmitter (blue)
1	FS635	passive transmitter (red)
1	NP615R	screw drill bit 3.2 mm dia.
1	NP281R	screw length gauge
1 1	NP616R	screw drill guide 3.2/ 100 mm
3	NP618R	RB screw driver on motor
2	NP619R	transmitter mounting sleeve
2	NP620R	bicortical screw 30 mm
2	NP621R	bicortical screw 35 mm
2	NP622R	bicortical screw 40 mm
2	NP623R	bicortical screw 45 mm
2	NP624R	bicortical screw 50 mm
1	NP625R	bicortical screw 55 mm
1	TA011029	ifu for passive Rigid Body
	TE899	packing stencil F/NQ169P (NP168)

OrthoPilot TKA instruments

Tray 2

1	NP603P	storage implant. instr
1	JF213R	1/1 size perf basket 485 x 253 x 76 mm
1	FS604	straight pointer
1	NP617R	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	universal positioning gears
1	NM769R	transmitter foot plate
2	NM743	elastic foot strap
1	JF511	cloth f. lining deep containers

Columbus MIOS instrumentation

Tray 1

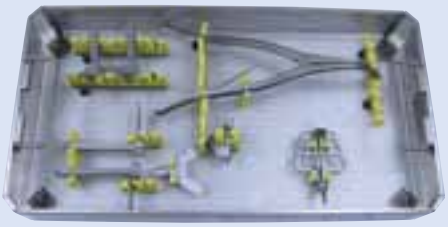
1	NQ934	Columbus MIOS set instruments part 1
1	NQ936	Columbus MIOS set 4-in-1 cutting guides
1	NQ939P	MIOS tray f/bone lever set
1	JF214R	1/1 size perf basket 485 x 253 x 106 mm
1	JF511	cloth f. lining deep containers
1	TE894	packing stencil F/NQ935P+NQ937P (NE340)

23.3 OrthoPilot TKA Columbus FS208 software

Software module	
OrthoPilot TKA Columbus	**FS208**

24 | Instrument set overview OrthoPilot® TKA VEGA System® IQ

24.1 ST0477 – OrthoPilot TKA VEGA System IQ



Software module
OrthoPilot TKA Vega System IQ **FS226**

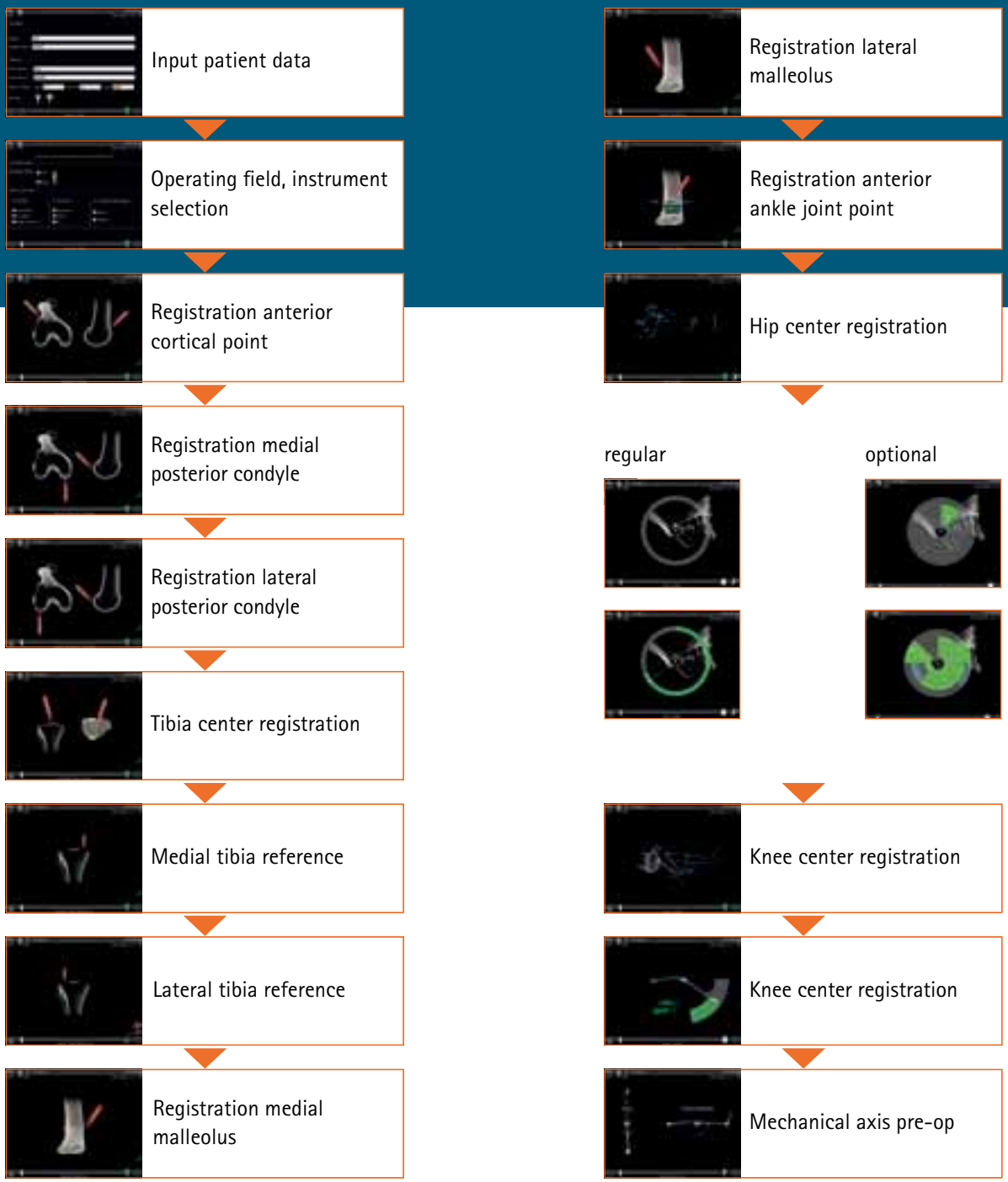
Tray 1 – Navigation Instruments		
Tray 1		
1	NP637R	IQ VEGA PS Tray Complement Set Navigation Instruments
1	JH217R	1/1 Size Wide Perforated Basket Lid, 489 x 257 mm
1	NS320R	IQ Navigated Femoral Alignment Block
1	NQ958R	MIOS® Y-Footplate for Alignment Block
1	FS626R	IQ OrthoPilot TKA RB-Adapter Modular
1	NP609R	Femorotibial Gap Distractor for NP604R
1	NP604R	Femorotibial Gap Measuring Gauge, 3 pcs Containers
1	JN442	Bottom F/1/1 Container Perforated, Height 135 mm
1	JK489	Full-Size Lid with Retention Plate, Silver

**Must also order Passive (ST0298) or Active (ST0127) set to accompany VEGA IQ Navigation Set*

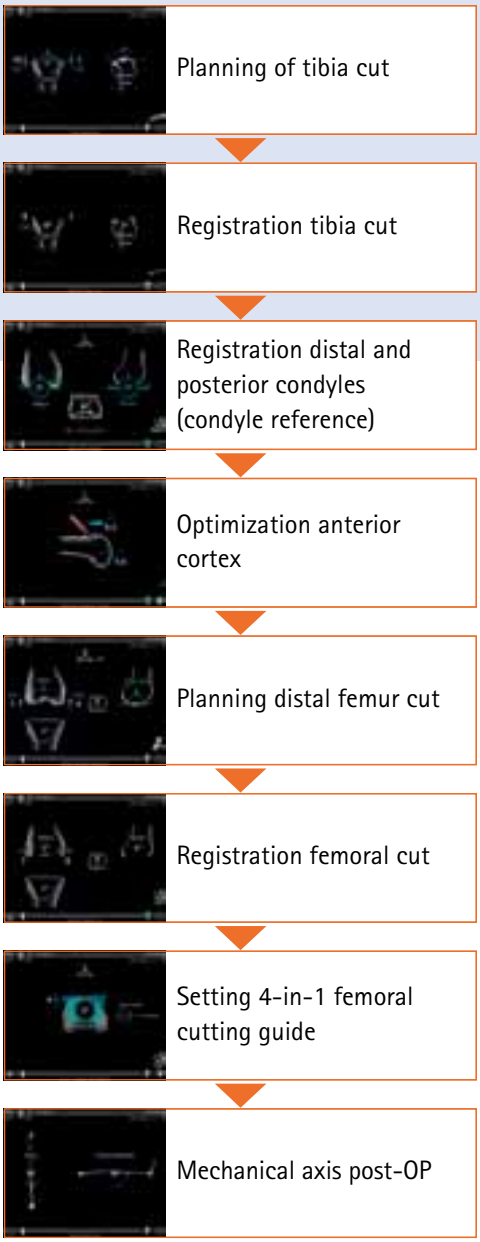
OrthoPilot® TKA – Smart

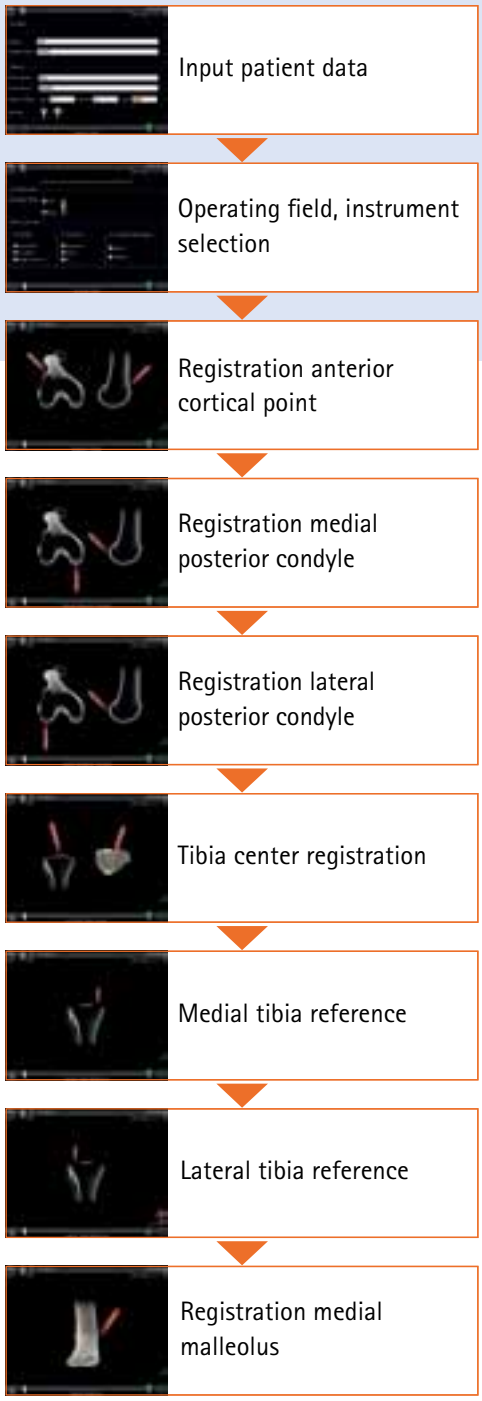
25 | Schematic program flow TKA Smart 1.0

25.1 Schematic program flow – Tibia First



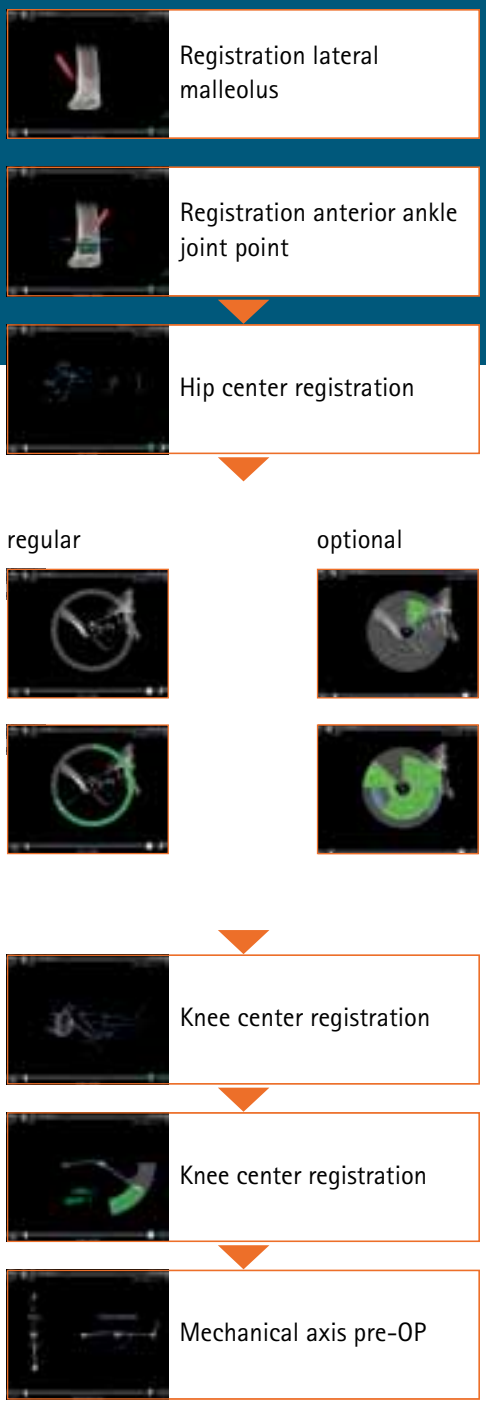
25.2 Schematic program flow – Femur First





OrthoPilot® TKA – Smart

25 | Schematic program flow TKA Smart 1.0



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