

# Genium. Set-up Guide



Information for practitioners



Quality for life

This set-up guide will provide additional hints and tips to assure high quality fittings and thus optimal outcomes. If you have additional questions please do not hesitate to contact a member of our professional and clinical services staff.

# 1. “Wake up” the Genium knee and charge the knee completely before use

▶ Charging the knee completely before use is strongly recommended.

Connect the tube adapter + insert the tube adapter in the frame and take care that the cable is placed in the tube.



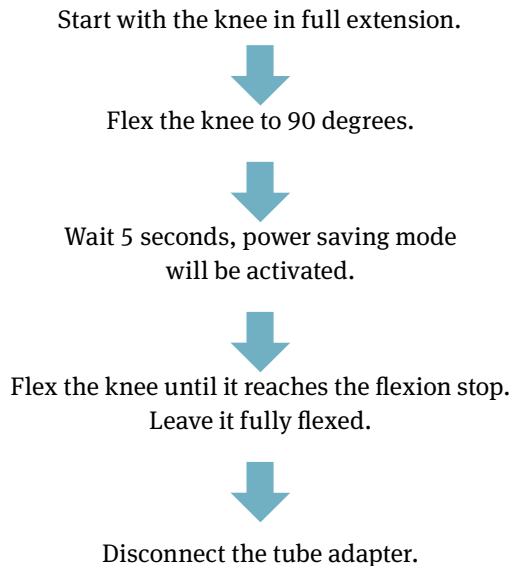
Charge the knee completely: The five lights should glow when Genium is fully charged.



When the charger is disconnected, the system will do a self test. The knee will beep and vibrate one time.

## 2. Put the Genium knee “to sleep”

Once the knee is fully charged, you'll need to perform the following sequence of events before disconnecting and cutting the tube adapter to the correct length.



## 3. If a knee error is detected, the knee will beep and/or vibrate repeatedly.

Ensure the tube adapter is connected properly.

↓

Connect the charger.

↓

Check the battery status using the charger.

↓

Disconnect the charger.

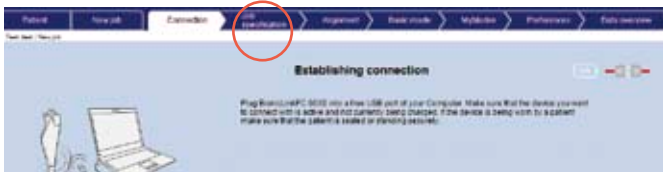
↓

The knee will perform a self test.

↓

If the knee beeps more than one time when the charger is removed, contact the Ottobock service center.

# 4. Determine the correct tube adapter (cutting) length



- 1 Leave the knee flexed when disconnecting the tube adapter.
- 2 Open X-Soft, create a new user, and open a new job.
- 3 Do not connect to the knee! First, click on the “Job Specifications” tab and then click on the “Ankle adapter configuration tool.”



- 4 Open the tube adapter configuration tool.

▶ Please note, that the knee center-ground distance from the prosthetic side may be significantly different than the knee center ground on the non prosthetic side: for example long residual limb.



- 5 Fill in the requested information.



- 6 The correct cutting length is displayed in the last line.

# 5. Cutting the tube adapter

## 5.1 Gently insert the cable as deeply as possible into the tube adapter

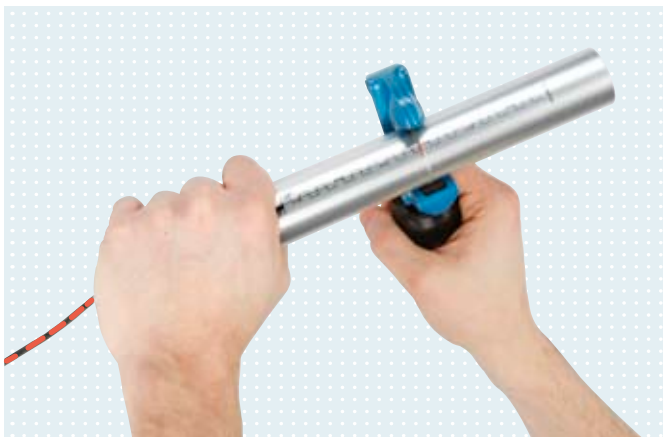


## 5.2 Cut the tube adapter

▶ without cutting the cable

Pull the cable out through the distal opening as illustrated in the photo below to prevent cutting the cable – only possible with tube adapter 2R20 (without torsion unit).

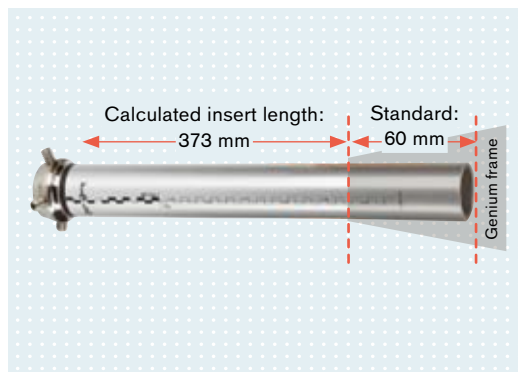
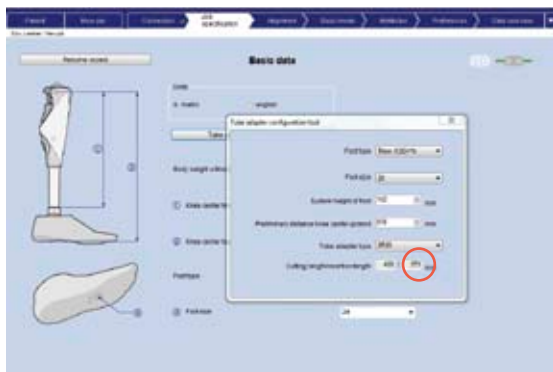
Bevel and smooth the internal and external surfaces of the tube adapter where it was cut.



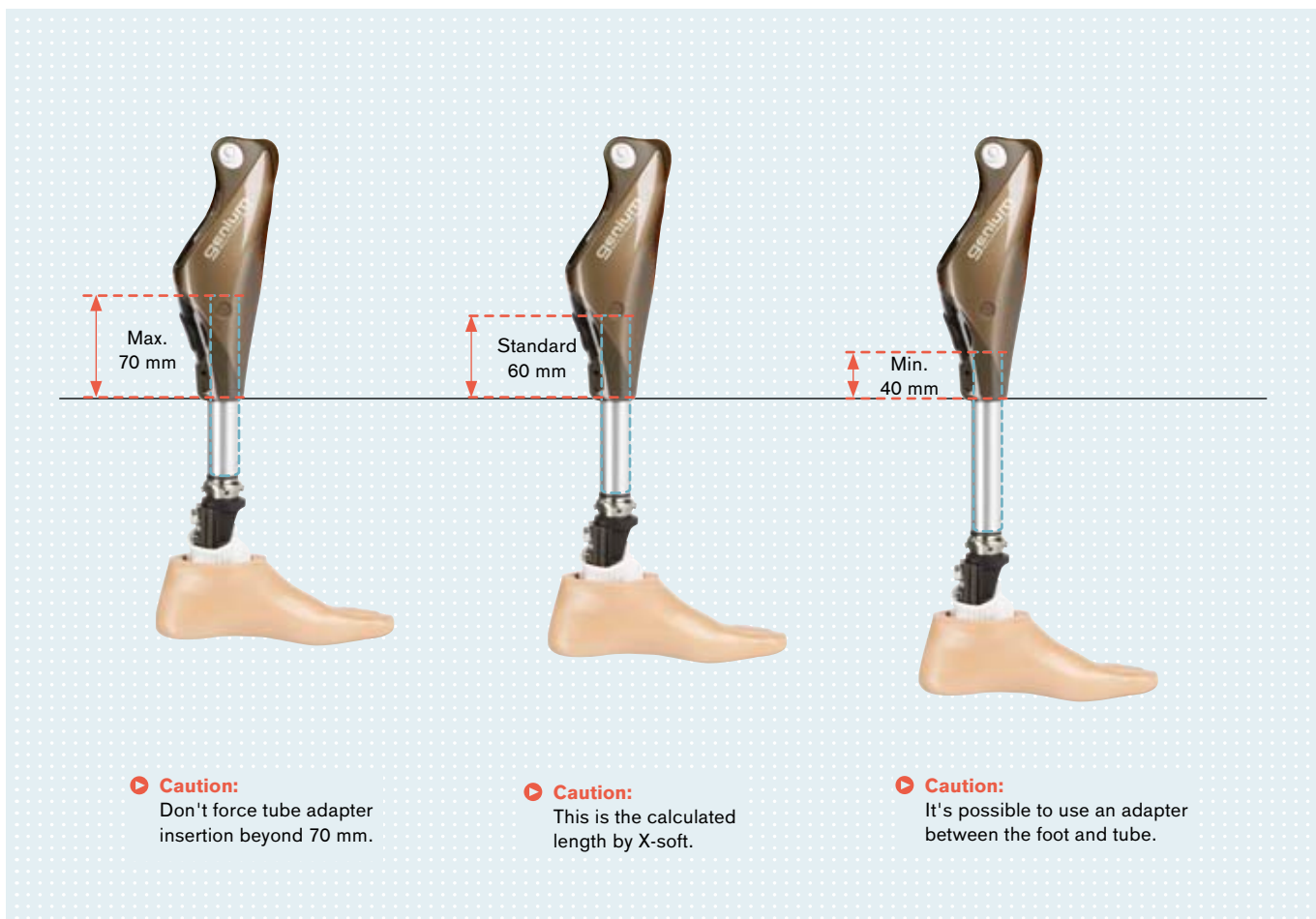
# 6. Connect the tube adapter

## 6.1 Mark the insertion length

Insertion example = 373mm

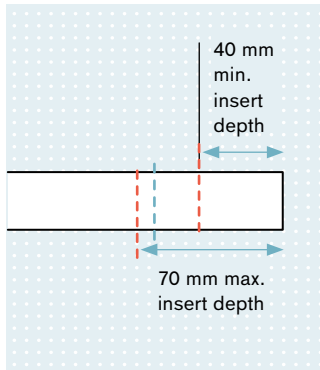


## 6.2 Calculate the max./min. insertion length



## 6.4 Mark the adjustment range

Adjustment range: 30 mm total



## 6.5 Connect the tube adapter

**Caution:** Do this gently!



## 6.6 Roll the cable gently into the tube and insert the tube into the frame.

The grid on the tube adapter must face anterior. **Warning!** Tube adapter insertion beyond 70 mm may cause damage to the main electronics. When the Tube adapter is cut to the shortest length, please insert the blue plug into the recesses of the tube adapter axial load sensor as seen in the photo below on the right side of the page.



# 7. Connecting to the knee joint



Verify you are connected by noting the presence of the Bluetooth illumination data transfer light on the back of the knee.

# 8. Job specification: Enter the user data

This is very important for ensuring proper function of the joint. Be precise when measuring and entering numbers in X-Soft.



Re-enter the data on this tab if any changes are made to the prosthetic height, foot type, foot size, or user's body weight.



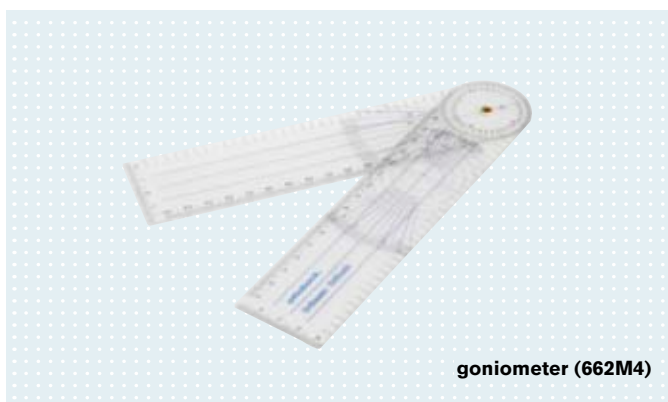
# 9. Alignment

## 9.1 Patient data



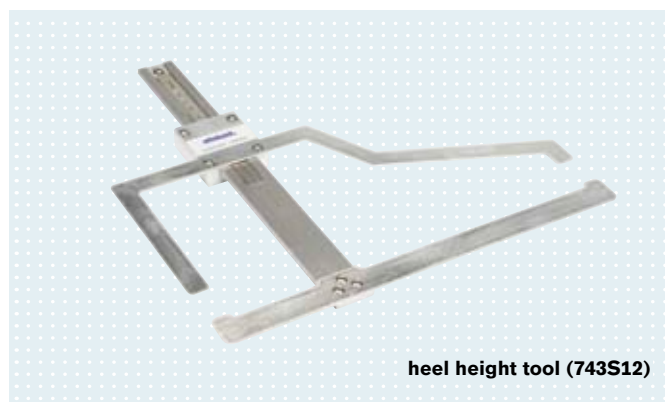
- 3 Choose amputation side
- 4 Choose amputation level

- 1 Hip flexion angle:  
Use the Thomas test and a goniometer.



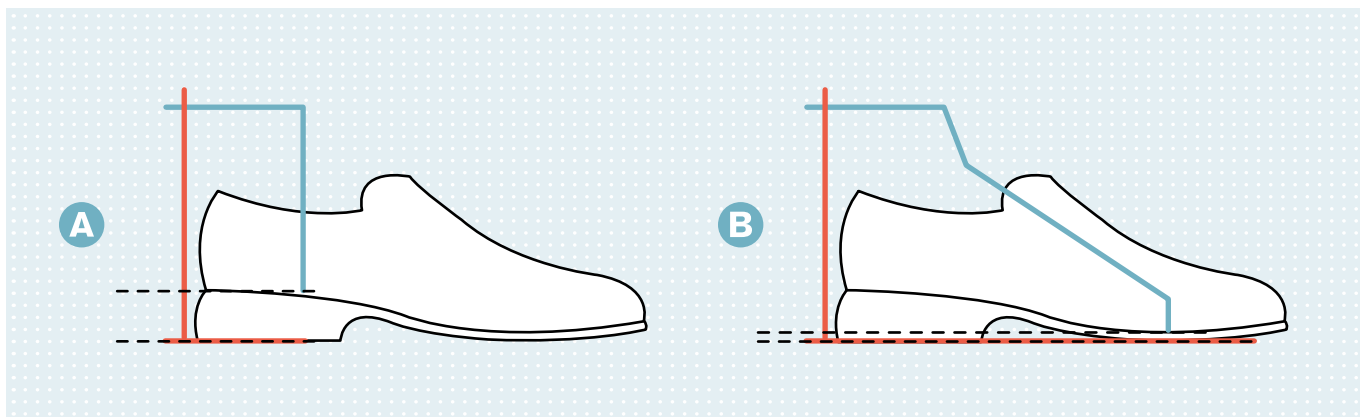
goniometer (662M4)

- 2 Measure the effective heel height of the user's shoe.  
The heel height measuring gauge is a useful tool.

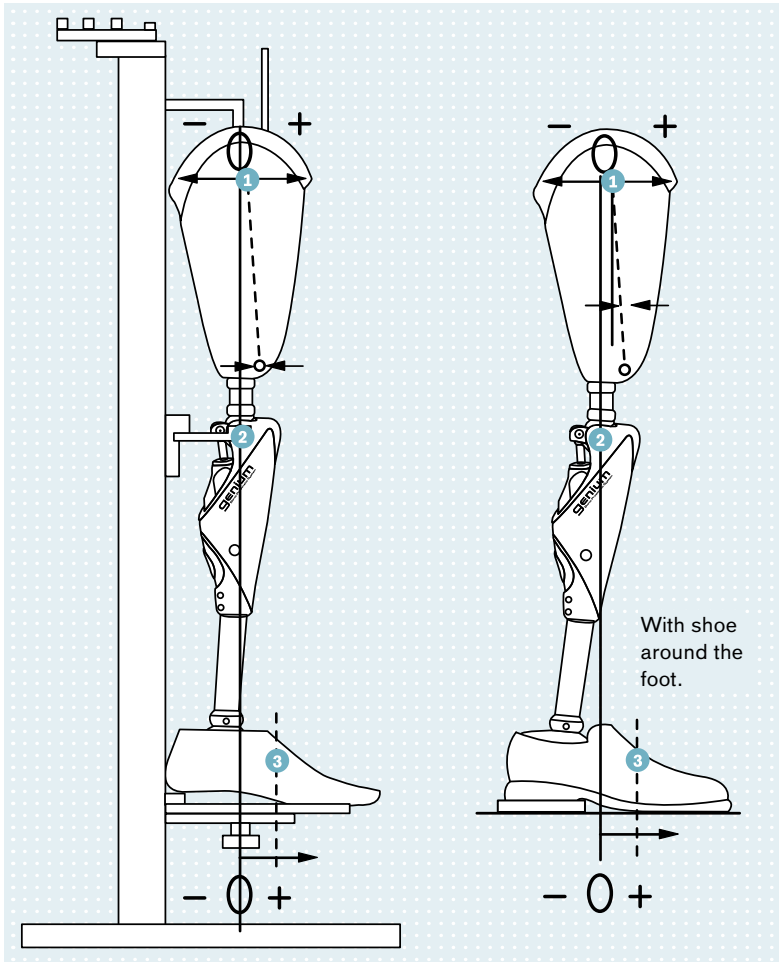


heel height tool (743S12)

A - B = Effective heel height



## 9.2 ASBAR – Amputee Specific Bench Alignment Recommendations



A personal alignment will be generated for the user in X-Soft based on the information you entered. The (P.R.O.S.A) assembly tool will lead to a more accurate and reproducible alignment result.

- Ensure the knee is in full extension during bench alignment.
- 3 important reference points:

### 1 Hip rotation point

Position in front of the bench alignment line  
(the exact distance is displayed in X-soft)

### 2 Knee rotation point

Position through the bench alignment line  
(the exact distance is displayed in X-soft)

### 3 Foot middle

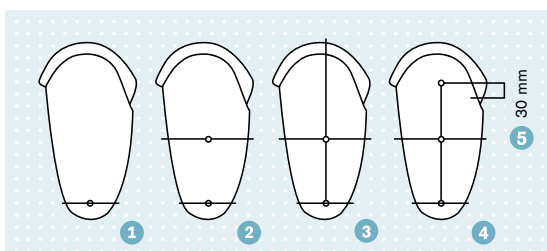
Positioned in front of the bench alignment line  
(the exact distance is displayed in X-soft)

Ensure the socket is not touching the hydraulic unit when the knee and/or adapters are placed in maximum flexion.

### Alignment and adjustment

#### Socket reference point

- 1 Position socket in a neutral position
- 2 Indicate the middle of the socket using the 743A80 (50-50 tool)
- 3 Draw a line through both points to the top of the socket
- 4 Find Ichial Tuberosity level and mark it on the line
- 5 Socket reference point = Ichial Tuberosity level + 30 mm





▶ Use these unique alignment reference points for the position of the foot, knee, and socket if you're using a LASAR assembly.



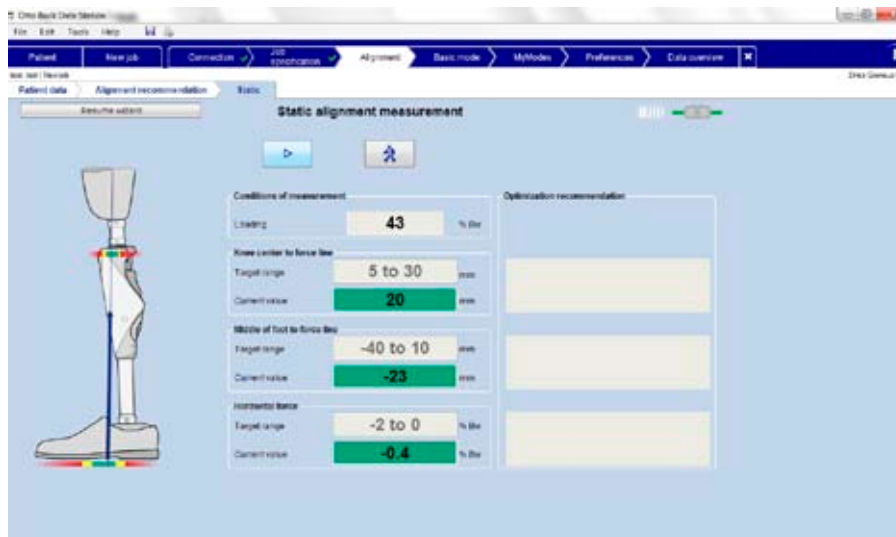
▶ Use these unique alignment reference points for the position of the foot, knee, and socket if you're using a plumb line, laser line, or vertical reference line for setting up the prosthesis.

Torque **all** adjustment screws to the appropriate recommendations.

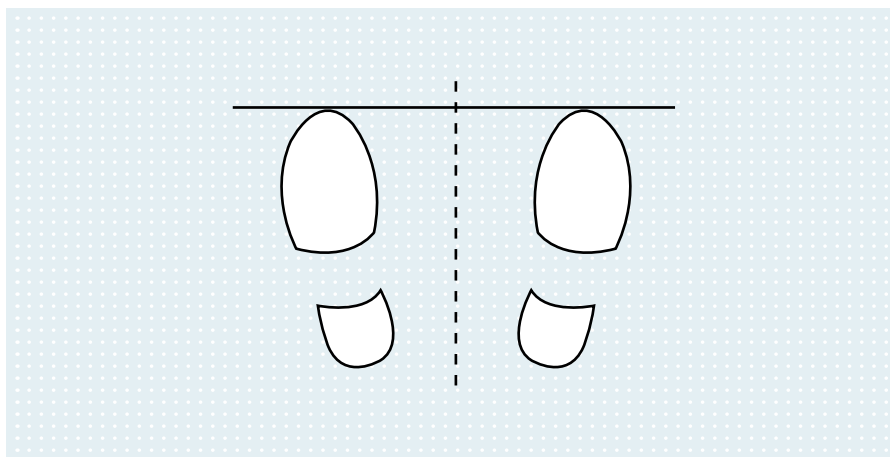


## 9.3 SASAR – Sensor Assisted Static Alignment Recommendations

### Important hints



- The goal is to ensure that the Ground Reaction Force line is in the middle range of the green zones and that the horizontal forces are either zero or only slightly negative!

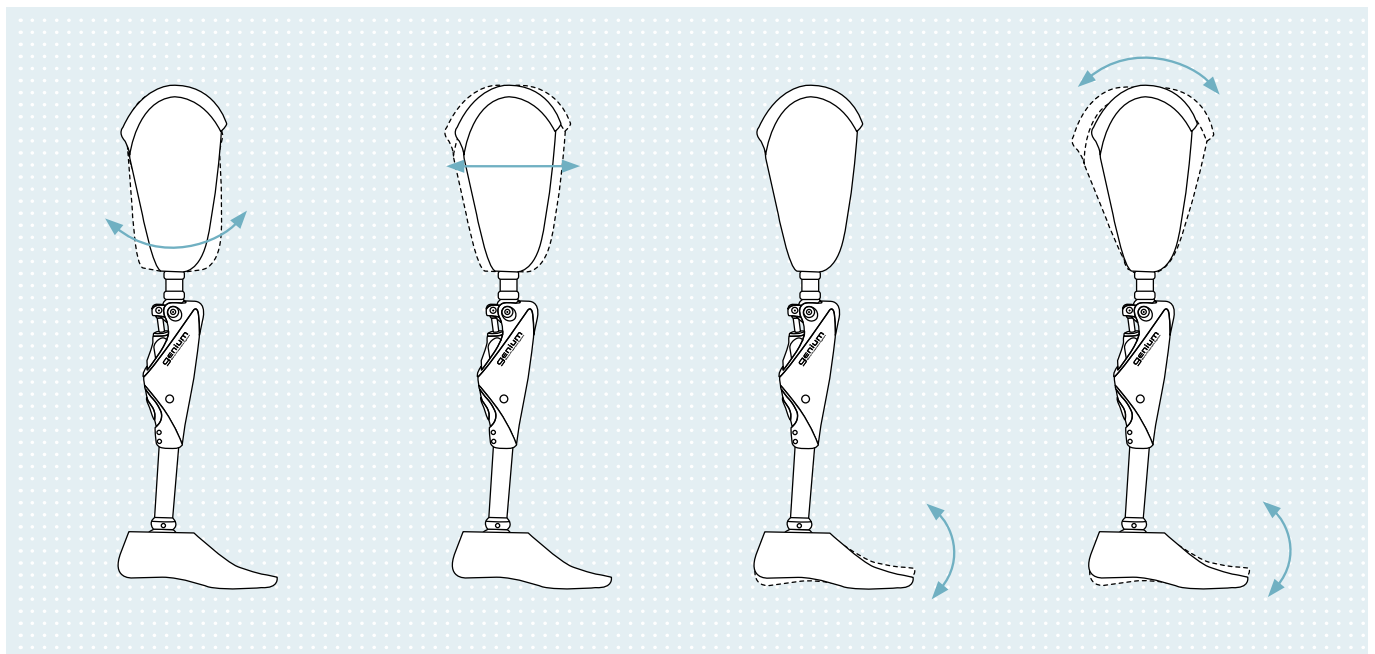


- Be aware of the users body posture and ensure they stand on a hard and level surface, relaxed and looking straight ahead, with the toes of both feet on the same level and their arms hanging relaxed on either side of their body.

## Optimizing the Alignment

- 1 Check the height of the prosthesis and frontal alignment (using L.A.S.A.R. Posture).
- 2 Push the pause button and then make any needed adjustments to the static alignment.
- 3 Press the play button to take a new measurement or press the walk button to let the user walk.
- 4 Perform the dynamic alignment.
- 5 Check the alignment again using L.A.S.A.R. Posture and SASAR.

## Options for optimization



Socket flexion

Socket position

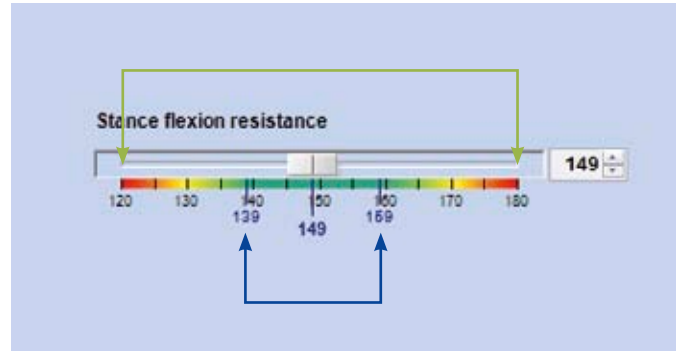
Plantar flexion

Foot position (combination!)

# 10. Basic mode

Genium created default settings that will be very close to the physiologic settings of this user. When the need is there this can be individualized by the:

- CPO: Using X-soft in the whole range
- User: Using the remote control in smaller range



## 10.1 Stance phase

- Default setting is based on the user's body weight entered in X-Soft
- Adjust during sitting and optimize this setting by increasing or decreasing stance resistance after the user has walked down stairs and (steep) inclines.



## 10.2 Swing phase

- Default setting is the physiologic swing angle: 65 degrees
- Changing 1° can have a significant effect
- Let the user walk allowing several steps to get used to this function
- Have the user walk at a slow, self selected and fast cadence



## 10.3 Functions

- Train the user to use these functions.
- We recommend “using” the Genium Gait training DVD.



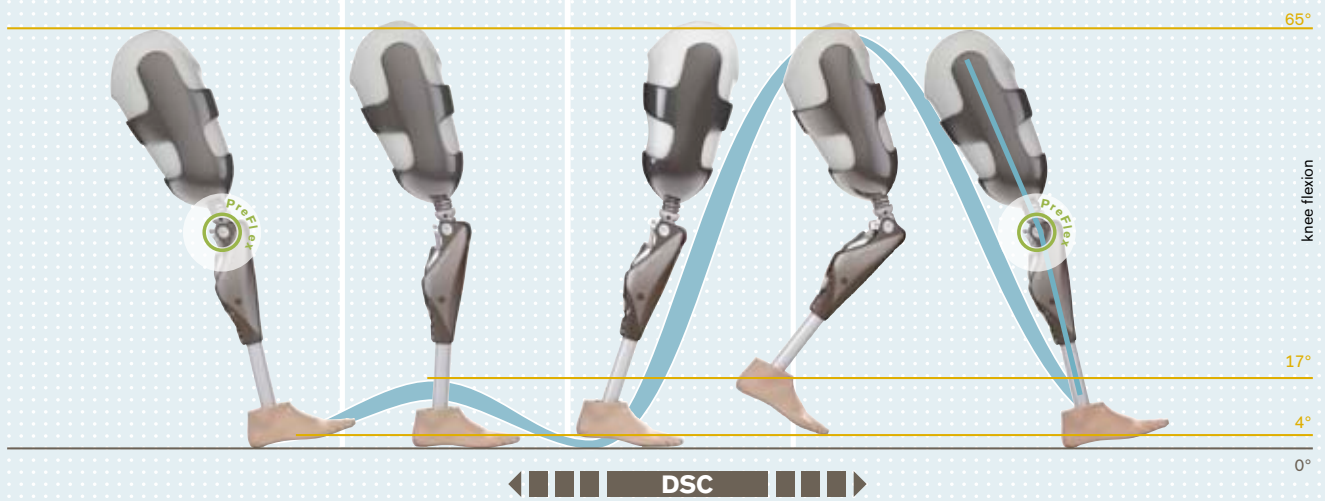
## Optimized Physiological Gait (OPG) Function

OPG minimizes the Genium user’s prosthetic deviations and promotes a more biomechanically correct gait pattern. There are no initiation or exit criteria that apply to OPG. It simply happens during the course of normal walking. Selection of this function enables the following features:

1 PreFlex, 2 Adaptive Yielding Control, 3 Dynamic Stability Control (DSC), 4 Stance Release on Ramps and

5 Adaptive Swing Phase Control. Adaptive Swing Phase Control and DSC are enabled even if OPG is not selected on the functions tab. Because stance extension and swing extension resistances are auto-adaptive, the sliders for these functions will be disabled during programming if OPG is selected on the functions tab.

OPG	Features
PreFlex	PreFlex ensures the knee is in four degrees of flexion at the end of swing phase in preparation for loading response. PreFlex allows users to walk with natural stance flexion independent of gait speed. The prosthetic foot will also reach foot flat more quickly to promote stability on uneven surfaces when PreFlex is present. PreFlex also allows users to ascend ramps in a more anatomically correct way by reducing the need for users to vault over a fully extended knee.
Adaptive Yielding Control	The knee has auto-adaptive stance and swing extension resistance. The stance flexion resistance experienced by the user is dependent on the slope or incline when walking downhill.
Dynamic stability Control (DSC)	DSC ensures the knee will not release stance resistance during biomechanically unstable static and dynamic conditions. Constantly checking multiple parameters, DSC ensures the optimally timed moment for the knee to safely switch from stance to swing. Because DSC is always monitoring knee function, multi-directional movement and walking backward are also possible without risk of stance resistance releasing.
Stance Release on Ramps	The flexed and partially loaded knee will release stance on hills and ramps to allow for greater knee flexion, improved swing phase clearance, and less hip flexion force needed to bring the shank into extension.
Adaptive Swing Phase Control	Instantaneous adaptation to varied walking cadences ensures the knee always achieves the swing flexion target angle within (+/-) one degree. The swing extension and flexion resistance experienced by the user is adaptive and varies, depending on the sensor inputs received by the microprocessor. Genium doesn't default to pre-programmed resistances. Swing flexion resistance remains auto-adaptive even when OPG is not selected on the functions tab.



### 1 PreFlex

### 2 Adaptive Yielding Control

### 3 Dynamic Stability Control (DSC)

### 4 Adaptive Swing Phase Control

#### User benefits

- Reduction of ground reaction forces for improved shock absorption and extended knee flexion that minimizes subsequent orthopaedic problems
- Reduced stride initiation effort
- Easier and safer negotiation of slopes, inclines and uneven terrain, as well as reduction of compensatory movements

- Considerably increased safety when walking backwards or taking large steps

- Quality of the swing phase is comparable to that of healthy person
- Increased ground clearance reduces the risk of stumbling and falling
- No limitation on stride variance (short, long, slow, fast, irregular)
- Automatic adaptation to different shoes and clothing
- Slope-dependent swing phase, offers more ground clearance on inclines

- Reduction of stride length asymmetry
- Significantly reduced cognitive effort and reduced need to control the prosthesis

## OPG User Exercises

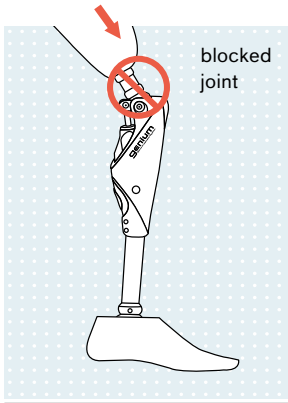
- 1 Watch the user walk with OPG turned on. Notice how the PreFlex feature affects stance flexion while walking on level ground and ascending a ramp. Turn OPG off (program the stance and swing extension resistance with it off) and have the user walk. Note the difference in knee performance.
- 2 Place a weight around the prosthetic ankle or apply a heavier shoe and notice the Adaptive Swing Phase Control.
- 3 Evaluate the Adaptive Yielding Control as the user sits into a chair and as the user walks down a steep ramp.
- 4 Ask the user to walk down a shallow ramp without pulling back on the knee. This will allow them to experience the effects of Adaptive Yielding Control. The knee will flex until it reaches a stop.



## Intuitive Stance Function

This function initiates a standing lock for maximizing stability and comfort while standing with a slightly flexed knee. This function locks and unlocks the knee only if all of the initiation criteria are met (see below). Therefore, the lock will never engage during sitting. Users must load the

prosthesis with 10% of their body weight to initiate the Intuitive Stance Function. The flexion valve will be fully closed once users reach 20% of their body weight through axial loading, resulting in a standing lock.



### Initiation Criteria (Locking the Knee)

Knee must be:

- 1 Flexed
- 2 Not flexing
- 3 Loaded
- 4 Not tilting forward or backward

### Exit Criteria (Unlocking the Knee)

The user must be:

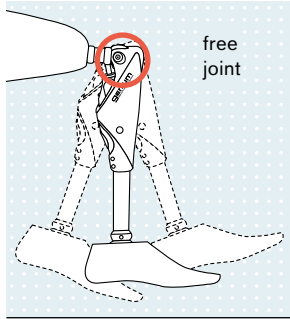
- 1 Un-weighting or...
- 2 Extending faster than a certain speed and allowing the knee to come close to full extension or...
- 3 Tilting the shank forward or backward

## Intuitive Stance Function User Exercises

- 1 Have the user lock the knee while standing in front of a chair. Then ask them to sit down. The knee will automatically unlock. Some users might report feeling an initial “stickiness” as the knee exits Intuitive Stance Function.
- 2 Ask the user to stand with the knee flexed, not flexing, and loaded at the top of a ramp. Once the flexion block engages, ask the user to take a step with their sound foot. The knee will automatically release the flexion block.
- 3 To engage Intuitive Stance Function, it’s often easier to first put the prosthesis slightly ahead of the sound limb, contract the gluteal muscles to hold the limb in place, and load the prosthesis.

## Sitting Function

This function activates free swing in the knee while the user is sitting to allow uninhibited knee flexion. Sitting Function engagement causes Genium to go into battery save mode.



### Initiation Criteria (Free Swing)

- 1 The user's thigh must be nearly parallel to the ground, such as when sitting or lying down.
- 2 Genium is motionless for two seconds.
- 3 Pylon is un-weighted.

### Exit Criteria

Genium will re-engage stance immediately when a user stands and extends the knee. For improved safety and stability, the user should attempt to reach a point close to full extension of the knee before transferring their full weight to the prosthesis when sitting function is engaged.

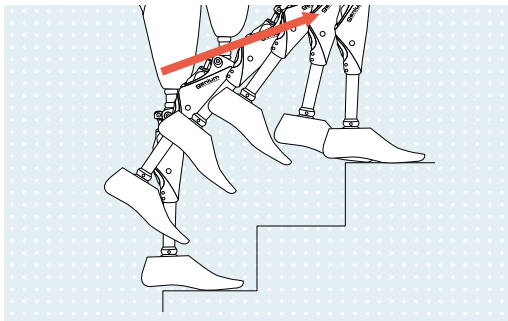
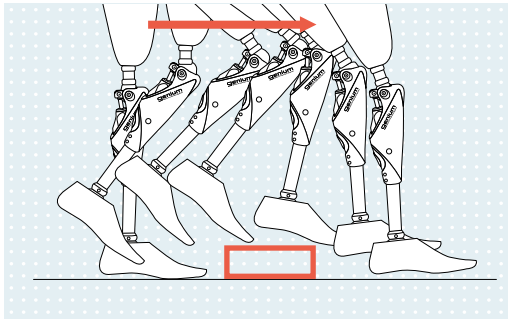
\*Battery save mode is activated even if Sitting Function is not selected during programming. In battery save mode, only the total angle sensor is active.

### Sitting Function User Exercises

- 1 Have the user sit into a chair. The knee will go into free swing after two seconds.
- 2 Have the user lie onto a bed, sofa, or exam table. The knee will go into free swing after two seconds – even when the knee is not flexed!
- 3 Ensure the user stands up quickly and fully extends the prosthesis to activate stance.

## Stairs and Obstacles Function

This function enables step over step stair ascent and allows users to cross obstacles in a more anatomically correct way. Sufficient residual limb hip extensor force and training are required.



### Initiation Criteria (Free Swing)

- 1 The prosthesis must be loaded and in full extension.
- 2 Swift hip extension must be followed by hip flexion, generating knee flexion and permitting proper foot placement on the stair.
- 3 Flexion is blocked upon axial loading.
- 4 Once flexion is blocked, the knee will freely move into controlled extension. As the user uses their gluteal muscles to extend the knee, they will ascend using active muscle contraction.

### Exit Criteria

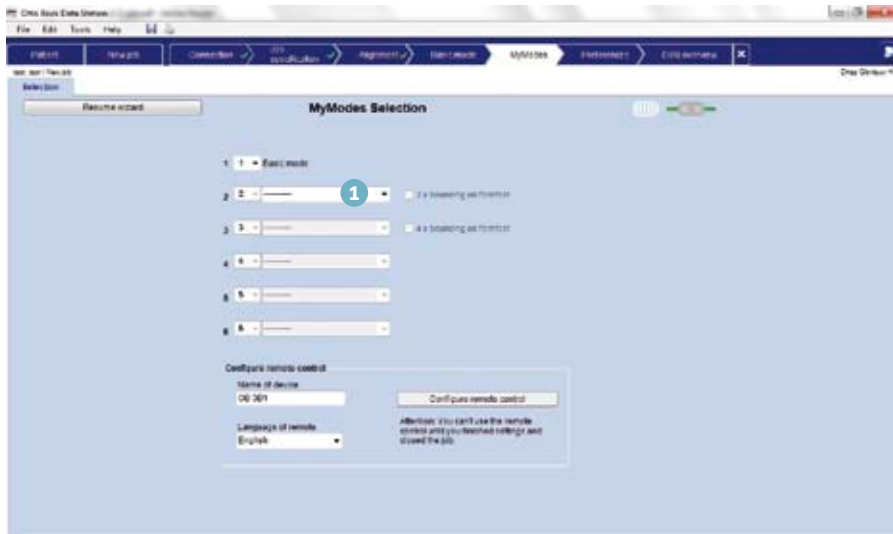
- 1 Removing weight from the prosthesis: Genium unlocks and evenly reduces to the stance flexion resistance.
- 2 Shank tilting backward: Genium opens the flexion valve and evenly reduces to the stance flexion resistance.
- 3 Shank tilting forward: Genium keeps the flexion valve blocked to allow the user to ride the locked knee forward, providing safety.
- 4 On stairs, a progressive blocking on the flexion valve engages as the knee moves freely into extension as long as the knee remains weighted.

\*Note: forward movement of a blocked knee on stairs causes the knee to stay locked, unlike forward movement of the knee during Intuitive Stance Function.

## Stairs and Obstacles Function User Exercises

- 1 Obstacles Function can be used to step over obstacles in a secure fashion. Users can initiate Obstacles Function by performing the same movement pattern used for initiating Stairs Function; the same initiation and exit criteria apply. Train users in obstacle mode on level surfaces before moving to the stairs. Have the user step over the obstacle with the sound side first then have the user repeat the exercise by stepping over the obstacle with the prosthetic side first.
- 2 Have the user begin stairs training at the bottom of a staircase. Some people will find it is easier to step up with the sound limb first and follow with the prosthesis.
- 3 Keep the prosthesis slightly behind the sound foot when initiating this function. This reduces shear against the ground and makes hip extension easier.
- 4 Ensure the sound foot is close to the bottom of the first stair during stairs up initiation. This will shorten the prosthetic step length, improve prosthetic foot placement, and decrease the hip extensor force needed to bring the prosthetic knee into full extension.
- 5 Keep as much of the prosthetic foot on the stair as possible when going up. This maximizes stability for the user.
- 6 Have the user lean slightly forward during stair ascent. This keeps the user's center of mass further ahead of the knee and consequently requires less hip extensor activity. If the users lean too far forward, they will shorten their hip flexors for the next step.
- 7 Greater toe clearance is generated by more intensive hip flexion activity following hip extension. Hip extension initiates opening of the flexion valve and doesn't have to be forceful.

# 11. Program the MyModes



1 Select the MyMode

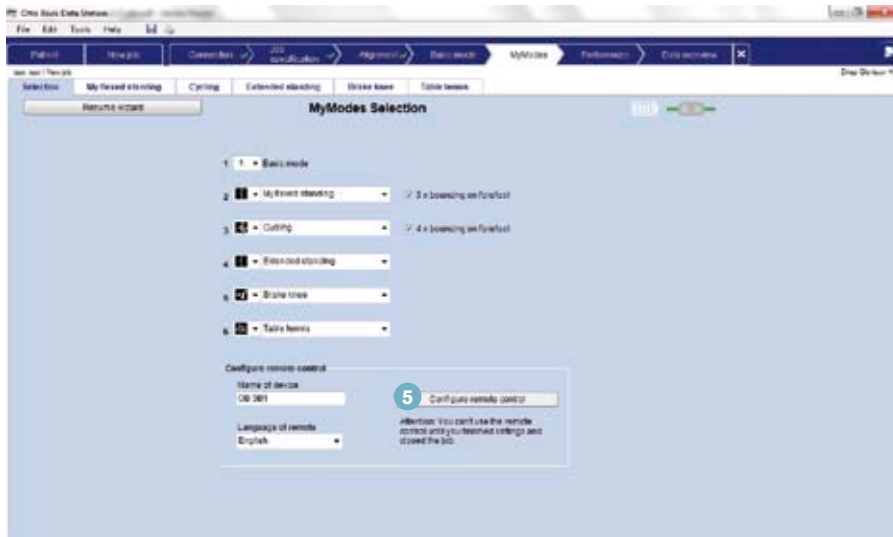


2 Select the MyMode that you want to program



3 Personalize the name of the MyMode

4 Personalizing the Basis and the Gain will change the blocked angle



- 5 Configure the remote control on the selection tab before proceeding

## 12. Adjust the preferences to the user needs

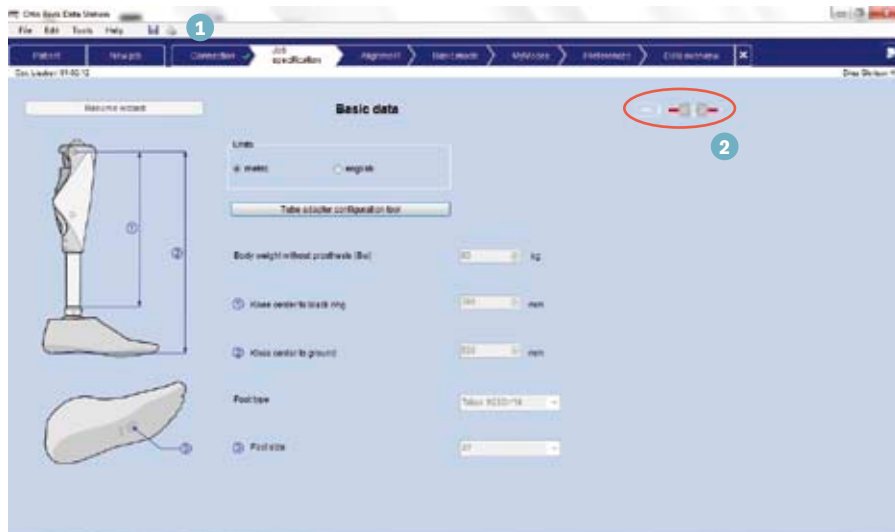


# 13. Data overview



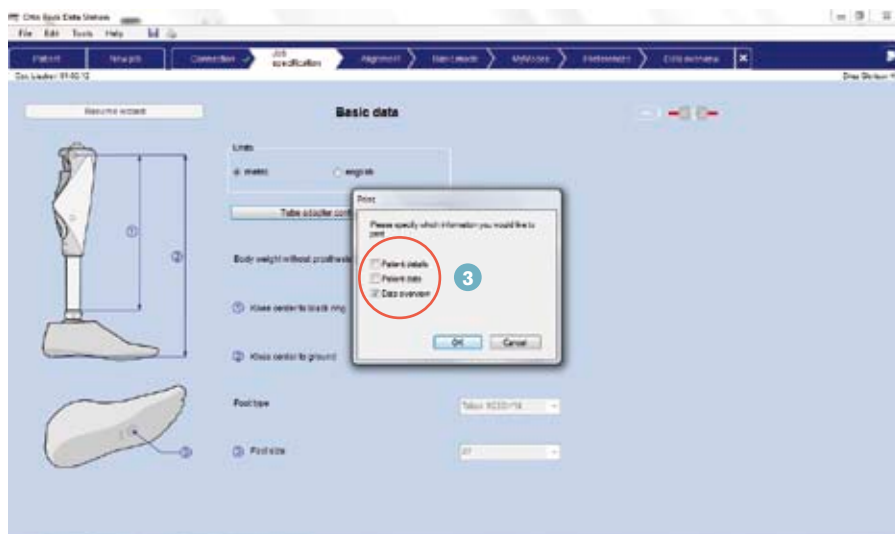
- Information can be entered and changed in the data overview by first selecting the "expert function" on the bottom left side of the data overview screen
- The stance extension and swing extension setting will only have an influence on the behavior of the prosthesis if the OPG function is deactivated.

# 14. How to print the data overview

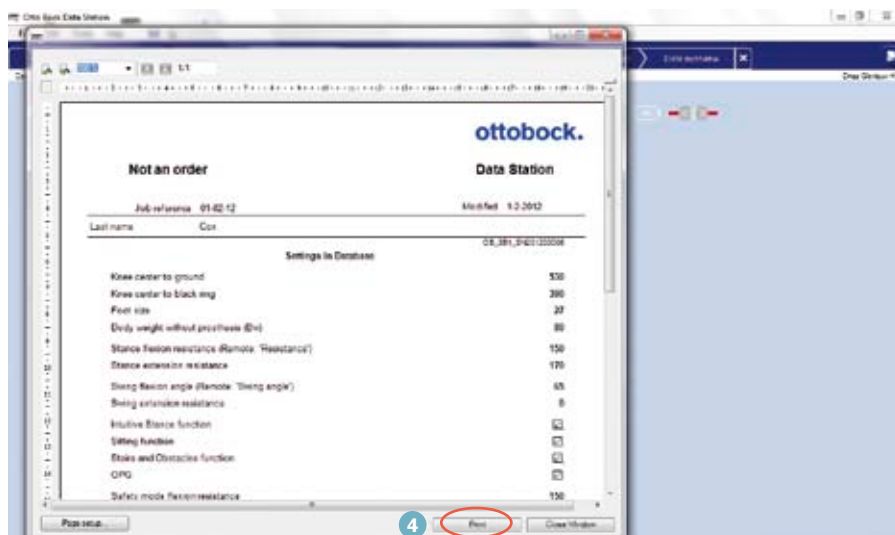


1 Click the print button: be sure that your PC is connected with a printer

2 It is not necessary to connect to the knee joint



3 Select or deselect the information that you want to print



4 Click the print button

