PROTEOR QUATTRO™ MICROPROCESSOR KNEE

PROTEOR QUATTRO™ PHYSICAL THERAPY GUIDE

The QUATTRO is a microprocessor swing and stance controlled prosthetic knee designed for transfemoral amputees of all activity and experience levels. The QUATTRO differs from other microprocessor controlled prosthetic knees you may have used. This document is designed to explain some of those differences and discuss exercises which can be performed to optimize the performance of the QUATTRO.

Adjustments made with the Freedom App: The QUATTRO's programming is App based. The Certified Prosthetist uses the GaitLab App to initially calibrate and program the optimal settings of the knee. The patient has the ability to make additional adjustments that are limited to +/- 10 points based on the settings set by the prosthetist, if the prosthetist allows the patient the ability to do so. Adjustments can be made to Sitting Resistance, Heel Rise Resistance, Swing Extension Resistance, Stance Extension Resistance, and Stair and Ramp Resistance. Please see the chart below for an overview of these adjustments

NOTE: Please consult with the user's prosthetist prior to making any adjustments to settings.

Open "Freedom App", hit "Connect", and select "Adjust" at the bottom of the screen.

Adjustment	Function	When to Adjust	
		When to Decrease Value	When to Increase Value
Sitting Resistance	Provides flexion resistance while sitting	Sitting motion delayed due to high resistance	Sitting motion is rapid due to low resistance
Heel Rise Resistance	Controls Heel Rise in Swing Flexion	Resistance is set too high which may present as toe scuffing	Resistance is too low, resulting in excessive heel rise
Swing Extension Resistance	Controls Swing Extension	User waiting for the knee to reach full extension	Swinging too quickly, which may result in terminal impact
*See note	Stance Extension Resistance	Knee extension at midstance	Very little or no extension moment is observed	Rapid knee extension at midstance
** See note	Stair and Ramp Resistance	Independent resistance setting for stair and ramp descent	Knee flexion is delayed due high resistance	Knee flexion is rapid due to low resistance

* Setting of this adjustment is only required when the user is ambulating with Stance Flexion
** QUATTRO recognizes when the user is sitting or descending stairs or ramps. These two resistance adjustments are independent of each other. (QUATTRO

Troubleshooting Guide for new QUATTRO

Function	How QUATTRO works	Suggestions
Not releasing into swing phase	Releases by loading and unloading of the toe	Ensure user is rolling onto the toe in gait. Use suggestions in the following section
Knee flexes when standing	Stable alignment needed	Un-accommodated hip flexion contracture, or not enough socket flexion (contact CP)
Abrupt knee extension at midstance	Ensure that the knee reaches full extension	Increase Stance Extension Resistance to control knee extension
Sitting resistance not changing with adjustments	Knee must reach full extension	In order for the adjustment to be made, QUATTRO requires that the knee reaches full extension between adjustments
High level of flexion resistance when sitting	When moving backwards QUATTRO defaults to high flexion resistance	Ensure that the shank is not moving backwards when sitting. Stand in front of the chair before sitting to prevent stepping backwards when sitting

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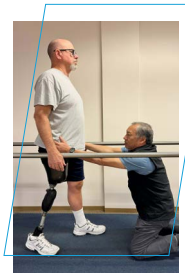
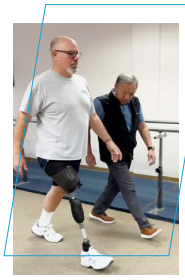
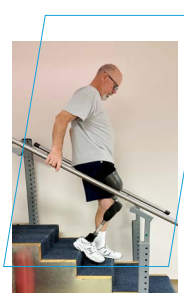
ACTIVITY		TEACHES	DESCRIPTION
Weight Shifting		Trust in the prosthesis and increasing proprioception	Have the patient stand in the parallel bars and shift their weight side-to-side and front-to-back. This can be done with double and single leg stance. If desired, you can also place a ball under the sound leg and have the patient move it in multiple directions. ***TIP:*** *Ensure the patient is shifting his or her weight to the four walls of the socket. This is especially important for the front-to-back motion of the socket to help mimic the socket forces at midstance.*
Ball Kicks		Weight transfer and releasing the knee into swing	Have the patient stand in the parallel bars and place a ball or your foot ahead of them on the prosthetic side. Begin by placing the prosthesis behind the patient. Have the patient load the prosthetic side then kick forward into the ball or your foot. ***TIP:*** *If the patient is performing the activity correctly, the knee should break into swing as the prosthesis is unweighted and weight is transferred to the contralateral limb.*
Pelvic Rotation		Pelvic rotation on the prosthetic side	Have the patient stand in the parallel bars with their sound leg a step ahead of their prosthetic leg. Place your hands on the patient's ASISs. This can be done from in front of or behind the patient. Apply a posteriorly directed force at the patient's ASIS while the patient steps forward with the prosthetic leg. This can be done with just a single step or a series of steps
Equal Step Length		Unloading of the knee and transition to swing	Walking side by side with your patient helps to work on equal step length. ***TIP:*** *Hip strength is important for proper use of the QUATTRO. Your patient should have hip extension strength adequate to perform a full step-through gait cycle. If your patient lacks this strength, strengthening exercises should be undertaken. A step-through gait pattern is important to trigger the QUATTRO into swing. A step-to gait pattern may cause the knee to stay in stance or cause infrequent swing. If your patient requires the use of an assistive device, it is recommended that they utilize a rolling walker or forearm crutches to allow a step-through gait pattern*
Stairs and Ramps		Ascent and descent of ramps and stairs	Ascent and descent of ramps and inclines tends to be very intuitive for patients. The most important aspect of descent is teaching the patient to ride the stance flexion resistance down the descent. For stair descent, have the patient place the anterior half of the foot off the stair. This will allow the knee to flex and the patient to descend step-over-step. Riding the stance flexion resistance during descent will allow the most control of the knee. For stair ascent, patients are advised to climb the stairs with their sound limb and lift the prosthesis behind them (a "step-to" pattern). ***TIP:*** *It may be necessary to adjust the stance flexion resistance in the app to optimize stair and ramp descent.*

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