

Meridium

Reclaim your way.



Quality for life

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With the development of the individualised Meridium prosthetic foot, Ottobock has incorporated the latest technology to achieve a particularly close approximation to the anatomy of the human foot.

Where conventional mechanical prosthetic feet have always represented a compromise between flexibility and stability, electronically controlled ankle joints have until now enabled primarily slight, gradual adjustments to the user's current gait behaviour.

But the new Meridium is completely different, featuring an impressive range of advantages that offer the user a significantly more precise adjustment to the current situation. As a result, the user feels extremely safe and enjoys a more natural pattern of movement.

Incorporating intelligent, real-time control, the 4-axis design therefore adjusts itself immediately to the user's walking speed and ground conditions, whether on slopes, stairs or varying terrain.

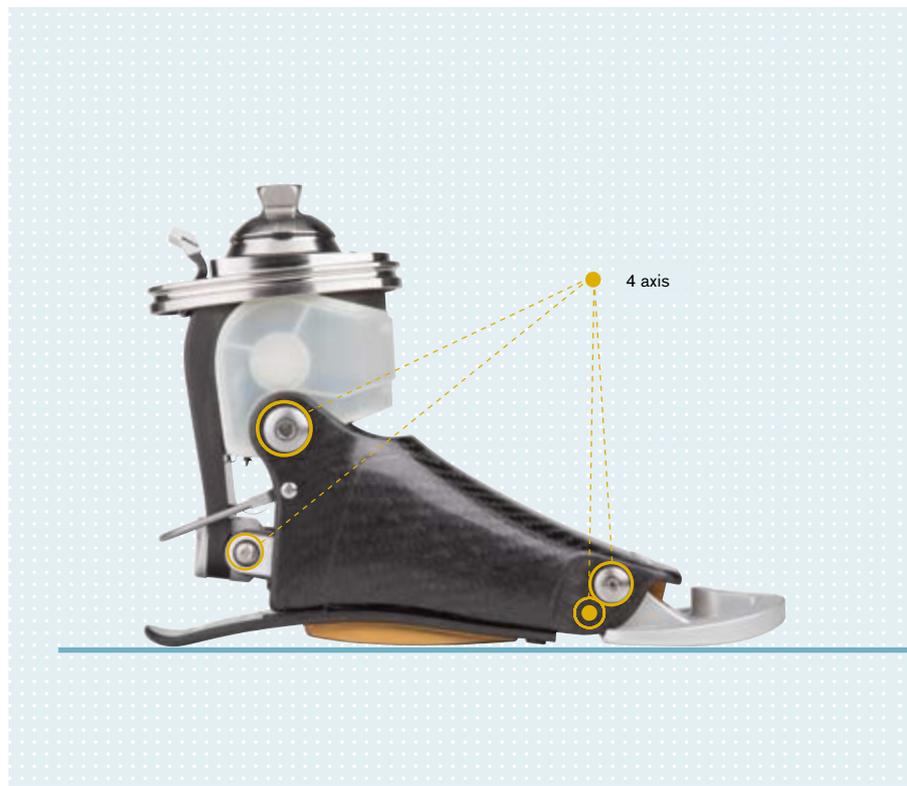
Based closely on the natural human anatomy, the Meridium prosthetic foot is movable not only in the ankle area, but also in the midfoot and toe region thanks to its additional axis. This is a big plus for the user during everyday activities, making both greater flexibility and enhanced stability possible.

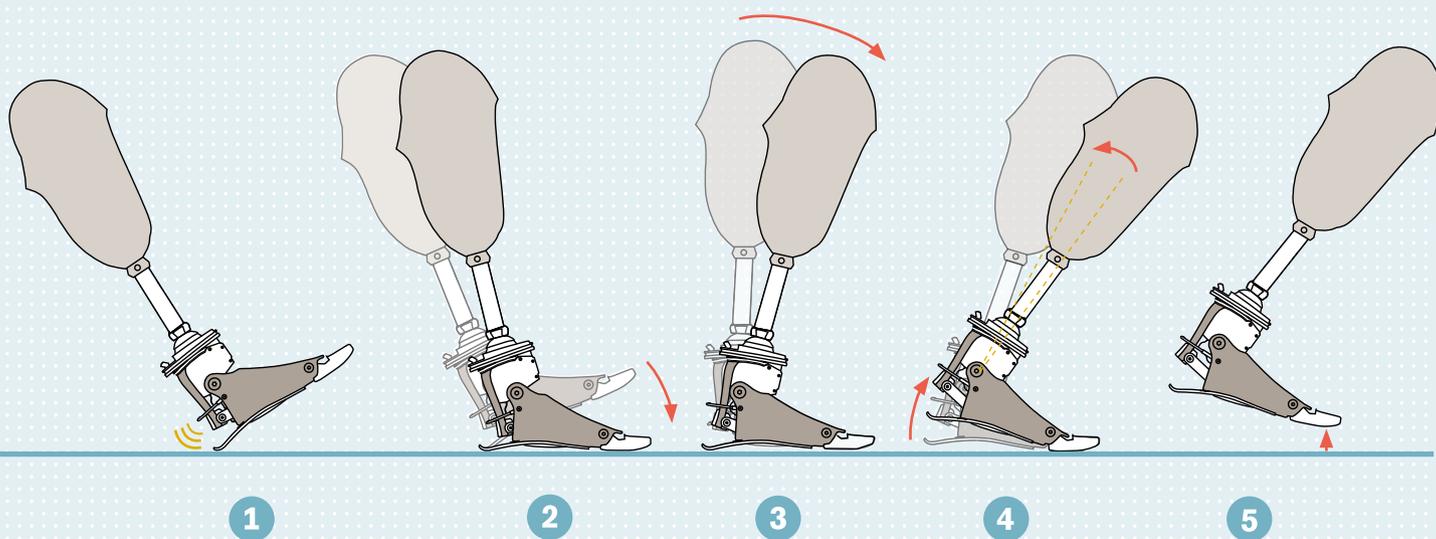




4-axis kinematics

The polyaxial construction and extensive real-time control, along with a broad range of motion, form the basis for the Meridium's nearly-natural replication of the human foot.

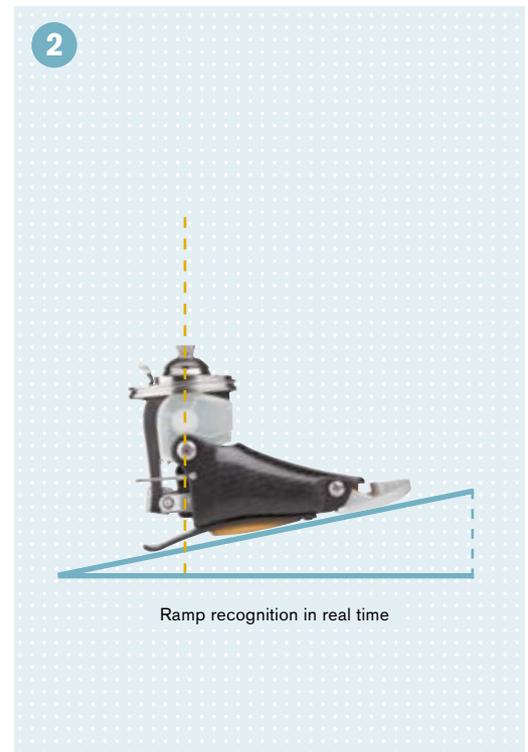
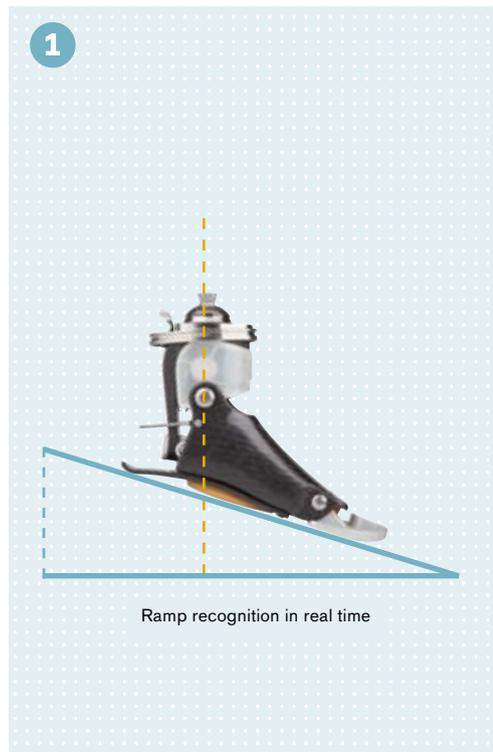




Walking on level surfaces

- 1** The hydraulic resistance is adjusted during initial ground contact to achieve a comfortable heel leverage adapted to the user's stride length.
- 2** Based on the individually adjusted plantar flexion resistance, the foot lowers itself according to the gait situation with every step.
- 3** Thanks to the wide range of motion and real-time adaptation, the user benefits from expanded, full-surface contact with the ground for the greatest possible stability and excellent traction. If the user changes their walking speed, the dorsiflexion resistance automatically adjusts itself to the change in forces. This allows the user to easily vary their speed without feeling any change in the foot's behaviour.
- 4** The movable toe plate provides a large contact surface and ensures uniform pressure distribution in the forefoot area when rolling over the foot at the end of the stance phase.

During foot rollover, the Meridium's four axis cause the ankle to plantar flex, which helps keep the body's centre of gravity from lowering during walking. The result is a smoother and more natural gait pattern, reducing the need for compensating movements that sap the user's energy.
- 5** If the foot is lifted from the floor, the hydraulics maintain an extended dorsiflexion position in order to allow greater ground clearance in the swing phase, while simultaneously achieving a higher degree of safety.



Master slopes and uneven ground

The Meridium recognises the current ground conditions and adjusts itself to the new situation in real time. If a slope or change in surface is detected, real-time adaptation already occurs from the very first step.

1 Descending

The possible plantar flexion angle and rollover angle are adjusted in real time according to the incline.

The lowering of the foot prevents undesired acceleration and the DF* resistance supports a consistent rollover across a wide range of motion. The user also benefits from secure foot placement, as the foot quickly gains full-surface contact with the ground.

The user also finds it easier to control knee flexion, because less flexion moment occurs. Improved gait symmetry is due to uniform load distribution across both legs, which means the heel is not lifted from the floor as quickly.

*dorsiflexion

2 Ascending

In comparison to the foot's behaviour on even surfaces, the rollover angle is increased when walking upwards.

During the swing phase, the foot remains in the dorsiflexion position to provide greater ground clearance. This prevents the tip of the foot from getting caught.

Walking up a ramp or slope on the surface of the foot becomes significantly easier, so the user needs to place less weight on their forefoot. This allows the user to place an equal load on both legs, and enables a more uniform gait symmetry as well.



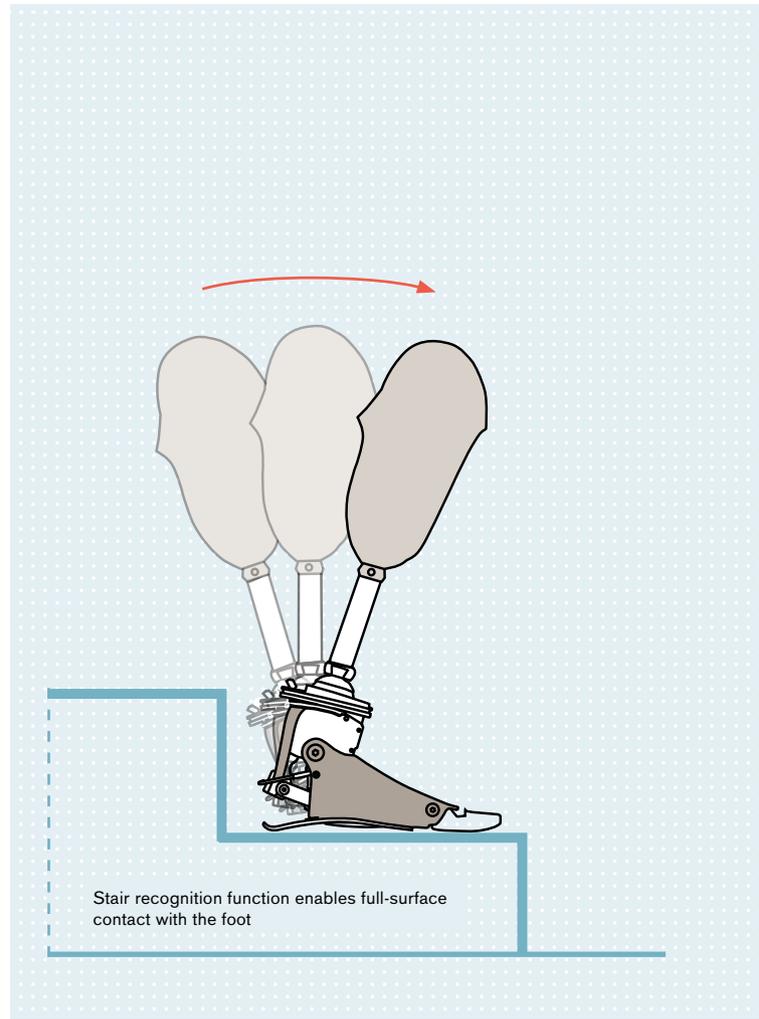
Walking on uneven ground

The advantages of real-time adjustment are particularly evident on uneven surfaces such as cobblestones, grass, forest paths and other similarly structured surfaces. With every step, the DF and PF* angles are fully and immediately adapted to the walking surface. The improved contact with the ground increases the user's safety.

By maintaining the relative lower leg angle in the foot, the necessary compensating mechanisms are reduced. Smaller obstacles are therefore no longer perceived as a problem, but rather as if they had been smoothed over.

*plantar flexion





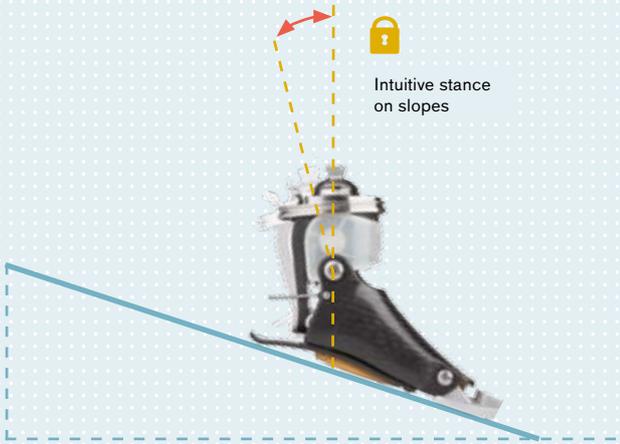
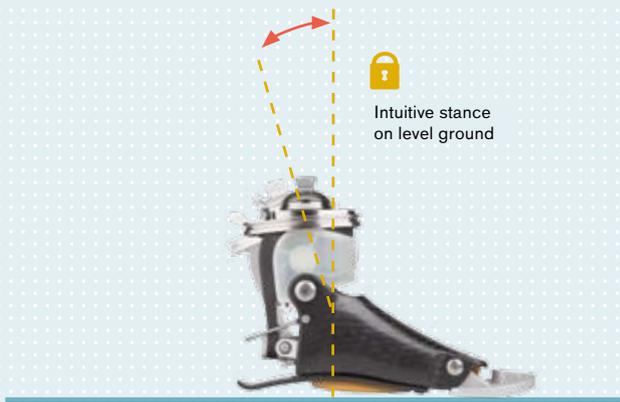
Walking down stairs

The Meridium prosthetic foot enables highly complex patterns of movement such as walking down stairs. While this is only possible with conventional feet by placing half of the foot on the step, the Meridium allows for full-surface, stable contact between the foot and the step.

In addition, both gait patterns can be used alternatively when descending stairs. Among other advantages, this means that uneven steps can also be safely and easily navigated – without the user having to concentrate specifically on each one.

The Meridium prosthetic foot recognises the movement pattern when walking on stairs and adjusts itself in real time, step by step.

The foot does this by adjusting the dorsiflexion resistance and increasing the rollover angle. As a result, the user gains enhanced safety and stability thanks to maximum ground contact when walking down stairs.



Intuitive stance

Gone are the times when users had to make compromises when switching between walking and standing: The Meridium prosthetic foot can differentiate based on the situation. The foot adjusts itself accordingly and controls dorsiflexion and plantar flexion resistance independently of one another.

Dorsiflexion is blocked when the user is standing to ensure a stable stance, but plantar flexion is simultaneously maintained so they can continue walking at any time. For the first time with a foot prosthesis, it doesn't matter whether the surface is flat or sloped. The user maintains the same level of stability in either case.

Relief function

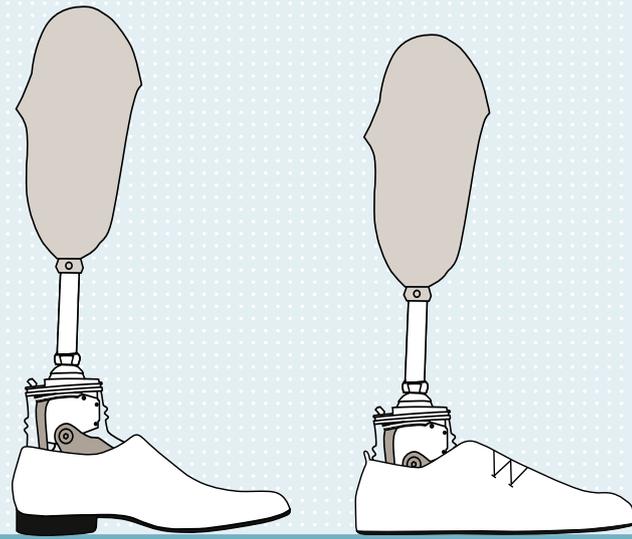
A further advantageous function for the user is the so-called relief function. This function automatically lowers the foot to the floor when a load is placed on the heel for a prolonged period, for example when sitting.

In addition to the purely external, natural-appearing foot position, users enjoy relief in the sitting and standing position. Particularly in areas with little legroom such as public transportation, theatres and cinemas, but also at desks and on longer flights, automatic adjustment offers the prosthesis wearer a noticeable degree of relief.



Relief function when sitting





Automatic heel height adjustment

Different occasions call for different shoes, and switching frequently between shoes with varying heel heights is much more than just a matter of fashion for women and men today. Whether it's safety shoes for work, sports and leisure shoes or elegant footwear for a social occasion – the right shoes are a must in many situations.

Adjusting the heel height of prosthetic feet is in most cases impossible or only possible with considerable effort, but the Meridium prosthetic foot sets standards in this regard as well.

The foot allows for heel height adjustment of up to 5 cm. The adjustment automatically takes effect within the

first 10-20 steps after the user changes shoes. Alternatively, an immediate adjustment can be carried out via smartphone app or a movement pattern. So even changing shoes multiple times is a snap for any user. Walking barefoot is also not an issue. A further advantage: The heel height which is set accordingly does not affect the overall statics of the prosthesis.

Easy-to-use modern technology for experts and users

M-Soft adjustment software

With the help of the M-Soft adjustment software, the Meridium can be simply and clearly configured to suit the relevant requirements and personal needs of the user.

For optimum adaptation, the adjustment software also provides support with integrated alignment recommendations.

Using the wireless Bluetooth® connection, the software makes testing various parameters with the patient easier, so you can quickly identify the ideal setting.



The Cockpit app Easy mobile control

The Meridium adjusts itself automatically to various situations. Using the convenient Cockpit app for Android, the user can also easily adjust the Meridium via smartphone. The app can be used to individually change the heel height, for example, or to select from a range of optionally preset MyModes.

The app also displays other information such as the charging status of the Meridium. Alternatively, simple motion patterns or the optionally available remote control can be used to carry out adjustments.



Meridium Details

1 Electronics and battery

Housed and protected within the ankle area. The integrated microprocessor processes the sensor data and controls the hydraulics in real time.

2 IMU – Inertial Motion Unit

Inside the IMU, a dedicated microprocessor processes the data from gyroscopes and acceleration sensors in order to determine the rotational speeds, rotational position, movements and the distances covered by the prosthesis in space. This enables the differentiation between standing and walking on level ground as well as on stairs and ramps and the activation of the energy-saving functions, e.g. when sitting.

3 Hydraulics

Control the plantar flexion and dorsiflexion of the foot independently of one another, thereby uniting flexibility and stability.

4 Toe plate

Made from aluminium with an abducted big toe, also forms the link between the carbon frame and the frontal rotation point of the hydraulics.

5 4-axis kinematics

Enables an especially close approximation to anatomical movement patterns. Four axis flexibly connect the toe plate, foot and ankle with one another.

6 Frame and heel spring

Made from carbon fibre, these stand out for their high stability and stiffness and also help to protect the hydraulics.

7 Moment sensor

Measures the force at foot contact in order to adjust the hydraulic resistance to body weight, load capacity, gait type and gait speed.

8 Angle sensor

Records the current angle and speed of the angle change during walking so the resistance can be adjusted to the gait speed and walking surface.

9 Ankle spring

Made from extremely stable, ultra-light carbon fibre laminate, connects the hydraulics in the foot with the pyramid adapter and encloses the electronics and battery in the ankle.



Warranty and service

The comprehensive warranty package offers your customers guaranteed mobility around the world with no repair costs for 6 years. In concrete terms, this means:

- 6-year manufacturer's warranty
- Repairs free of charge*
- Free service inspections in months 24 and 48
- Service unit for use during repairs, free of charge

Ottobock also offers an alternative three-year warranty package. This package can also be extended to six years at a later date if desired.

* Superficial damage and damage resulting from improper use, intent, negligence or force majeure are not covered.

Components and accessories



The scope of delivery for the Meridium includes the footshell and donning aid as well as the battery charger and AC adapter.

Unique footshell technology

The footshell developed especially for the Meridium is especially robust.

For the first time, the newly patented footshell combines two areas with different properties in one product. It is extremely stable in the sole and forefoot area, but particularly flexible in the ankle area at the same time. The footshell adapts

itself to the high mobility of the foot with its bellows and also provides reliable protection against splashed water. For the first time, the footshells are also available in a translucent version (1) in addition to the standard colours of beige (4) and light brown (15).

Technical data

MOBIS	2, 3, 4
Amputation level	Transtibial, knee disarticulation, transfemoral, bilateral transtibial
Max. body weight	100 kg
Weight with footshell	Size 24–25 1250 g; size 26–27 1500 g; size 28–29 1550 g
System height	S: 24–25 132 mm; M: 26–27 142 mm; L: 28–29 145 mm
Structural height	S: 24–25 166 mm; M: 26–27 175 mm; L: 28–29 178 mm
Heel height	0–50 mm
Range of motion for size 27	36.5° (22° PF; 14.5° DF)
Operating time when battery is fully charged	1 day
Approved knee joints	C-Leg, C-Leg compact, Genium, Genium X3

Indications and contraindications

Indications

- Leg amputees with amputation levels: transtibial, knee disarticulation*, transfemoral*
- Mobility grades 2, 3, 4
- Max. body weight 100 kg
- Foot sizes: 24 cm to 29 cm

*Knee disarticulation and transfemoral fittings are to be combined exclusively with the C-Leg, C-Leg compact, Genium and Genium X3 microprocessor-controlled knee joints from Ottobock.

The Meridium is especially well suited for patients who ...

- frequently walk on uneven ground. The real-time control of the hydraulics enables immediate adaptation to various, changing surfaces such as rough paths, small obstacles, grass and cobblestones.
- frequently walk on declines or slopes. The flexion and rollover angle are adjusted according to the surface, enabling a smoother gait. The foot remains in a dorsiflexion position when walking upwards to prevent it from getting caught during the swing phase. Quick, full-surface ground contact ensures that the user's foot is securely positioned when walking downwards.
- walk frequently on stairs. When walking down stairs, an increased rollover angle and greater dorsiflexion resistance enable the user to place the entire surface of their foot on the step, thereby giving them greater, stable contact with the ground.
- frequently walk longer distances. The 4-axis design enables a particularly close approximation to the physiological gait. The hydraulic resistance is adjusted during initial ground contact to achieve a comfortable heel leverage adapted to the user's stride length. During the stance phase, the ankle movement and the movable toe plate allow for smooth rollover as well as full-surface contact between the foot and the floor. During the swing phase, the foot remains in the dorsiflexion position and provides greater ground clearance.
- stand frequently and/or for long periods of time. The Meridium automatically detects that the user is standing and adjusts itself accordingly. Dorsiflexion is blocked during standing, granting the user a secure stance – whether on level ground or on slopes.
- primarily work in a seated position or who frequently sit for long periods: The relief function moves the foot to a natural-looking, plantar flexed position. Above all, this provides relief for the residual limb in addition to full-surface contact between the foot and the floor.
- frequently wear different types of shoes, e.g. work shoes, trainers or going out shoes. After a few steps, the Meridium automatically adjusts itself in the new shoes to heel heights of up to 5 cm. The statics of the prosthesis are not affected by the new heel height.
- want to easily vary their walking speed at any time. When the user slows their walking pace, the microprocessor-controlled hydraulics increase dorsiflexion resistance to provide greater stability. Dorsiflexion resistance is reduced at higher walking speeds to facilitate rollover of the foot.

Contraindications

- Amputees with mobility grade 1 (indoor walker)
- Hip disarticulation amputees and bilateral transfemoral/ knee disarticulation amputees
- Cognitive disabilities or life circumstances which contradict the proper handling of the Meridium

