



ottobock.

Quality for life

## Confidence in the next step

Perfect-fit support for physical and occupational therapists working with older, less mobile lower limb amputees.

Information for therapists

# We support you in your work

Older amputees with low mobility levels make up the largest group of amputees and present you as an attending physiotherapist or occupational therapist with very specific challenges.

They are weaker and in many cases are also more restricted in other areas than young people. Even everyday activities such as standing up and sitting down, maintaining their balance and walking on level surfaces (let alone uneven ground) pose difficulties. The fear of falling is with affected persons during every step they take – and all too often means that they become more uncertain and therefore more afraid of falling.

But it doesn't have to be this way: We're here to support you as you work to achieve the best possible treatment outcome for every one of your patients. This brochure provides you with further information and useful facts regarding training with amputees.

Let's get started: Returning to a life that is as active as possible requires the patient's confidence in the prosthesis.

Visit our website for further information regarding specific exercises and the seminars we offer:

[www.ottobockus.com/therapy](http://www.ottobockus.com/therapy)



Knowledge, experience and expertise: your therapy partner

Ottobock has been helping people with limited mobility maintain or regain their freedom of movement for over 90 years. As the global market leader in our field, we achieve this by fabricating cutting-edge prostheses – while simultaneously encouraging an integrated treatment approach. After all, we will only be able to achieve the best outcome for every patient if everyone involved in treatment works together – from family members, to physicians, to therapists, to the O&P professional.

## What does amputation mean – and when is it necessary?

An amputation refers to the separation of a bone from healthy tissue or the removal of a limb from a joint (disarticulation). An amputation is used when the chances of an injured or diseased limb being able to heal are considered to be too small, thereby endangering the life of the patient.

The majority of amputations come about as the result of vascular diseases or diabetes – and thereby primarily affect older people. Other causes may include infections, accidents, cancer or a congenital malformation.



## Knowledge that benefits your work: our offer for therapists

Early therapy contributes to greater treatment success, and ideally begins even before the amputation.

Therapists play a key role here, helping their patients lay the groundwork for mobility following the amputation.

But not every therapist has the same level of experience in carrying out training with amputees. When working with the largest patient group – older people – it's particularly important to be familiar with the special aspects of rehabilitation for prosthesis users so you can respond individually to the needs of every single patient.

Perception, coordination and mobility are restricted in many cases, which can pose an even greater challenge for your work. The information in this brochure will help you facilitate the best possible rehabilitation process for every patient. If you're looking for even more in-depth information, we would like to invite you to attend one or more of our special seminars for physiotherapists and occupational therapists.

# The closer the cooperation, the better the rehabilitation outcome for the patient

## Your role as a therapist

There may be a wide variety of reasons for an amputation – but every single patient has the same need for a closely coordinated treatment team. This is based on the fact that an interdisciplinary exchange as partners between everyone involved, including family members, plays an especially significant role in supporting a positive healing process.

As a therapist, you are a key player in the rehabilitation process: You support the user in continuing to lead a life that is as independent as possible. For this reason, we highly recommend that you work closely with physicians, carers and the responsible O&P professional throughout the entire course of treatment so you can provide a unified treatment approach. Ideally, your work with the person affected will begin even before the amputation – which will of course only be an option if the procedure is planned.

Directly after the amputation, the focus is oedema therapy, mobilisation and scar care, after which you can begin muscle strengthening exercises and gait training. In the best case scenario, training will not be restricted to inpatient or outpatient rehabilitation sessions after the amputation, but will rather be integrated into the amputee's everyday day life via regular therapy as well, thereby promoting a continually improved gait pattern.

In order to provide training on using and walking with the prosthesis, it's absolutely necessary that you understand the respective functions of the prosthetic solution selected for the patient. Because the components are compiled for every amputee on an individual basis, we recommend that you discuss the specific product being used and its functions with an O&P professional prior to commencing a course of therapy.



# Providing the patient with optimal support – ideally even before the amputation

## Early start of therapy

Therapy ideally begins even before the amputation. Examples include mobilisation of the contralateral side, or training in the use of appropriate devices such as walkers or crutches. However, therapeutic measures – in addition to the usual preventive treatment – should be carried out as soon as possible: These include light preparatory training directly after the amputation as well as ongoing training to strengthen the musculature and practice handling the prosthesis. The type and intensity of training differ depending on the healing of the amputation wound and on the physical condition of your patient.

A wide range of further information and application examples are available on our website. Our therapy recommendations include specific exercises for every phase of treatment:



### Before the amputation

The patient is prepared for the subsequent steps. Appropriate exercises strengthen the musculature so that contractions can be avoided.



### After the amputation

Work begins directly after surgery, with a focus on oedema therapy, initial mobilisation and scar care.



### Exercises for life at home

After healing has progressed sufficiently, the muscles are stretched and strengthened. After the patient receives their prosthesis, the focus is handling the individual prosthesis and corresponding gait training.

Detailed therapy recommendations and more are available for download at

[www.ottobockus.com/therapy](http://www.ottobockus.com/therapy)



# The prosthesis in focus:

## alignment, components and more

### The components of a prosthesis

The O&P professional constructs each prosthesis individually. Learn about the components used.

A leg prosthesis consists of various components. Every prosthesis has a socket, a foot, connecting elements (adapters) and, in many cases, a cosmetic cover. A prosthetic knee and hip joint may also be installed, depending on the amputation level.

The **prosthetic socket** is the connection between the residual limb and prosthetic components. The O&P professional fabricates it individually using high-quality materials such as carbon, lamination resin and silicone. The quality of the socket and a perfect fit are crucial for wearer comfort and achieving the optimal usability of the prosthesis functions.

**Adapters** connect the prosthetic components to each other and enable them to be positioned correctly. Some adapters offer additional functions: The rotation adapter makes donning and doffing easier, for example.

The **prosthetic foot** has a significant impact on safe, comfortable standing as well as the entire gait pattern. The O&P professional selects the foot on the basis of characteristics such as heel stiffness, forefoot dynamics and stability – according to the needs and gait behaviour of the user.

Transfemoral prostheses also include a **prosthetic knee joint**, which can be individually adapted to the user and the functions of the other prosthetic components. These range from mechanical to microprocessor-controlled joints, which support intuitive use.

The prosthesis can be covered with a **cosmesis**. Cosmeses made of foam are used in many cases. The O&P professional customises them using grinding techniques in order to re-establish a leg volume that is as natural as possible. Special protective covers are available as an alternative for microprocessor-controlled knee joints, protecting the joint against impacts and wear and tear as well as restoring the leg's volume.

### Interim prosthesis

Before users are fitted with a final prosthesis, the surgical wound has to heal and must be prepared for wearing a prosthesis. The O&P professional therefore initially provides the patient with a trial prosthesis in order to determine the optimum fit of the socket and identify suitable prosthetic components.

### Definitive prosthesis

The amputee ultimately receives a prosthesis that takes their individual needs into account and is adapted to their lifestyle.

# Glossary of common terms in the field of lower limb prosthetics

## **Above-knee amputation**

See transfemoral amputation.

## **Amputation level**

The amputation level describes the place where a body part is amputated. It is determined by the surgeon before the operation.

## **Below-knee amputation**

See transtibial amputation.

## **Bilateral amputation**

Both arms or both legs are amputated in part or entirely.

## **Bouncing**

The limited flexion of a knee joint under load against a dampening resistance.

## **Definitive prosthesis**

After the interim prosthesis, the amputee receives a final prosthesis that takes their individual needs into account and fits their lifestyle.

## **Donning sheath**

The donning sheath is a funnel-shaped piece of fabric that makes it easier for transfemoral amputees to put on their prosthesis. Using them makes it possible to pull the residual limb more smoothly into the prosthetic socket.

## **Foot amputation**

More than 12 different amputation levels are known in the area of the foot from the toe to a metatarsal amputation.

## **Hemipelvectomy**

The entire leg and parts of the pelvis up to the sacrum are amputated.

## **Interim prosthesis**

Before amputees are provided with a definitive prosthesis, the volume of the residual limb must be stable and the surgical wound must be healed and prepared for wearing a prosthesis. The O&P professional therefore initially provides the patient with a trial prosthesis in order to determine the optimum fit of the socket and identify suitable prosthetic components.

## **Knee disarticulation**

With this method, the knee joint is severed and the lower leg is removed, while the thigh bone remains intact.

## **Liner**

A sock-like cover for the residual limb that acts as a sort of “second skin” between the movable soft tissue of the residual limb and the socket. The liner protects and cushions the pressure-sensitive areas of the residual limb and, together with a suspension system, connects the residual limb to the prosthesis. Selecting the right liner is essential in order to ensure the prosthesis fits perfectly and is comfortable to wear.





### Microprocessor-controlled knee joint

Thanks to a complex sensor system, a microprocessor in the prosthetic knee detects certain movement patterns and for example controls the swing and stance phases in real time. It makes intuitive use and a virtually physiological gait pattern possible for the user.

### Mobility grade

The amputee's activity level plays an important role in selecting the prosthetic components. The following mobility grades are differentiated in orthopaedic technology:

#### 1. Low mobility grade

Known as indoor walkers, these users are able to cover short distances on even surfaces and at low speeds – by using appropriate devices, such as walkers.

#### 2. Moderate mobility grade

Known as restricted outdoor walkers, these users are able to also walk on uneven surfaces and negotiate low obstacles such as curbs and steps – by using appropriate devices, such as walkers or forearm crutches. Some may not require any devices in indoor areas.

#### 3. High mobility grade

Known as unrestricted outdoor walkers, these users are able to walk on almost any surface and at various speeds, and also cover longer distances. Able to cross most obstacles, they can work as well as participate in therapeutic and other activities.

#### 4. Especially high mobility grade

Unrestricted outdoor walkers with especially rigorous demands are able to master even more difficult challenges in sports, at work

environment or during leisure activities with their prosthesis.

### Modular prosthesis

Consists of various components; for example, foot, knee, adapter and socket. Individual combinations can therefore be assembled according to the users' needs. By contrast, the foot or knee is connected to the socket in an exoskeletal design. Modular prostheses are more commonly used today.

### Prosthetic foot

An artificial foot which the O&P professional carefully selects to ensure safe, comfortable standing as well as a smooth gait pattern.

### Prosthetic knee joint

An artificial knee that serves as a functional replacement for the physiological knee. The various prosthetic knee joints support the

individual requirements according to the mobility of the user.

### Prosthetic socket

Interface between the patient's body and the prosthetic components attached to it. It is a highly sensitive element since it determines the comfort of the prosthesis to a large extent. This is why it is individually fabricated in each case. To ensure the perfect fit of the socket, the patient's body dimensions have to be determined with the highest precision.

### Rotation adapter

A prosthetic component that allows the user to rotate the lower leg to the side – a characteristic that proves helpful, for example when putting on shoes. A rotation adapter is used for patients with transfemoral amputations and higher-level amputations.

### Stance phase

The moment from first heel contact until the big toe lifts off within a gait cycle.

### Swing phase

Describes the moment when the foot swings free in the air while walking.

### Torsion adapter

Absorbs all rotation forces that act on the prosthesis in the stance phase. It also facilitates movement within confined spaces.

### Transfemoral amputation

In a transfemoral or above-knee amputation, the limb is severed through the thigh bone.

### Transtibial amputation

In a transtibial or below-knee amputation, the procedure is done through the tibia.

### Vacuum system

A vacuum system generates a vacuum between the liner and socket using an "active principle" (pump) or "passive principle" (pistoning movement of the residual limb). The objective is good suspension of the prosthesis on the body.

### Yielding

Stance phase flexion in the knee joint under load.

Get the details on our next training seminar now:

[www.ottobockus.com/therapy](http://www.ottobockus.com/therapy)



