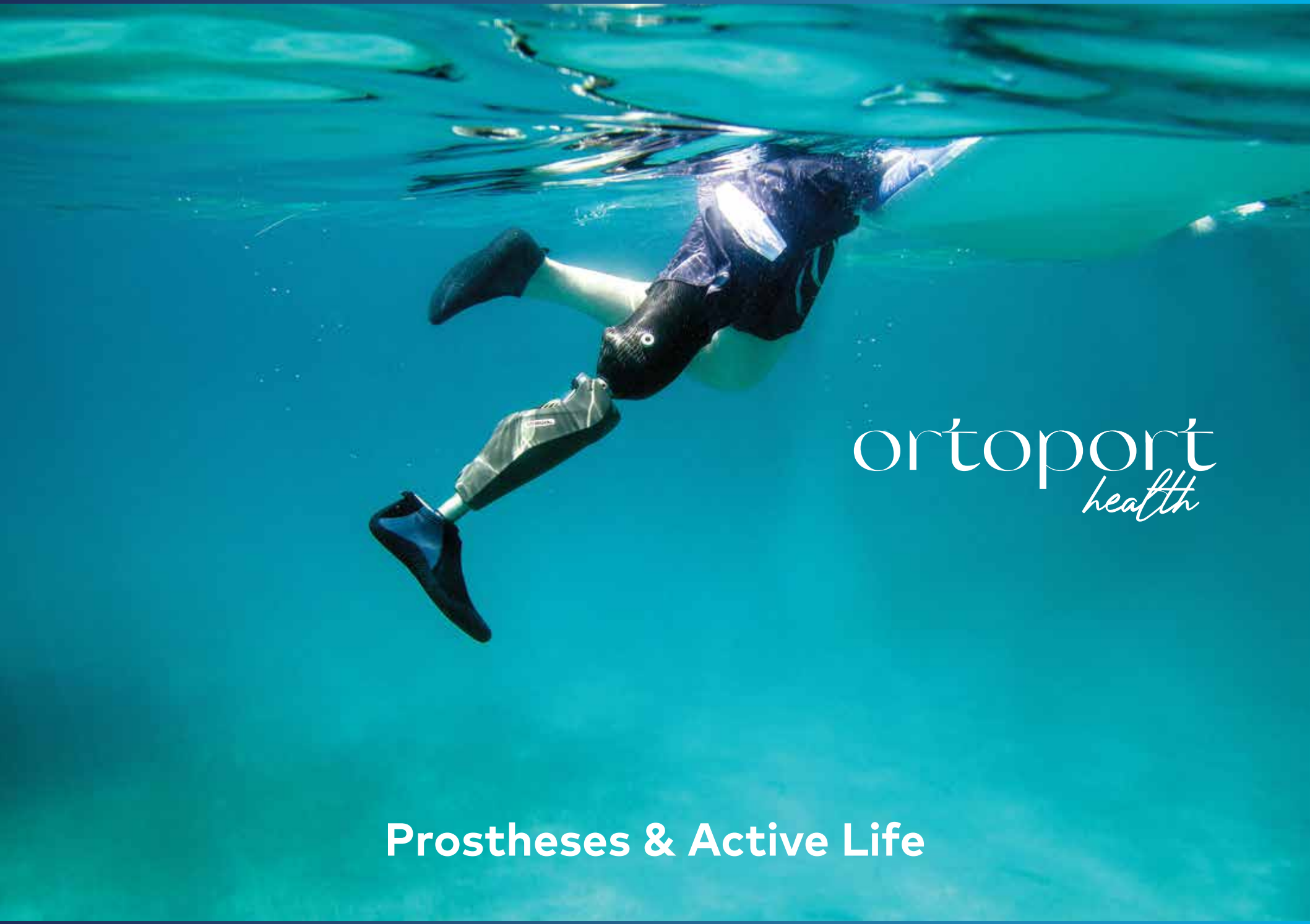

Prostheses & Active Life

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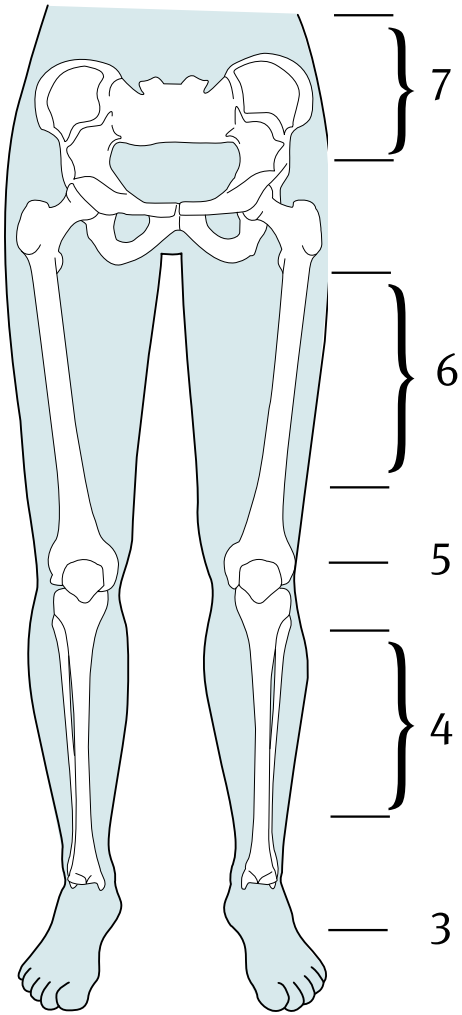
What Is Amputation?



Amputation is described as the separation of a bone in healthy tissue or the removal of a limb at a joint (arm or leg). Residual limb is also called "Stump".

What are the reasons of amputation?

Especially vascular diseases, traffic accidents, occupational accidents, chronic microbic diseases, congenital anomalies, serious burns, blood circulatory disorders due to diabetes. Without adequ- ate blood flow, the body's cells cannot get oxygen and nutrients they need from the bloodstream. As a result, the affected tissue begins to die and infection may set in and if this situation goes on it causes dangerous condi- tions such as gangrene. In this case, an amputation is decided to save patient's life and prevent progression of the problematic tissue.

What are the Amputation Levels?

Hemipelvectomy: The entire leg and part of the pelvis up to the sacrum are amputa- ted. (7)

Hip disarticulation: the amputation is performed in the hip joint area.

Transfemoral amputation: In a transfemoral amputation or amputation in the thigh area, the thigh bone is separated. (6)

Knee disarticulation: The knee joint is separated and the lower leg is removed. The entire thigh is retained in the process.(5)

Transtibial Amputation: An amputation of the lower leg, the tibia and fibula bones are separated.(4)

Partial foot amputations (Chopart, Pirogoff, Lisfanc, Syme): Different amputation in the foot area. (3)

Maintenance After Amputation
(postoperative period)

Amputation is an important event in one's life that requires serious change and transformation. Nowadays, with the advantages offered by technological development, amputated people can continue their life without abandoning their social identity. But to make it real, well shaped residual limb and a good residual limb prosthesis harmony is an essential.

Some reasons that may occur after surgery makes prosthesis fitting difficult and sometimes impossible. These are undiversible oedema, wound site infection, circulatory and sensitivity disorder, phantom pain. Such complications cause shapeless residual limb, muscle shortness (contractures) due to prolonged immobility, muscle weakness and condition looseness.

Treatment program with the authorised clinical personnel, will be directed in the right way prior to prosthetic fitting.

Under all conditions, scar treatment, shape of residual limb, persistence of joint mobility and strengthening of remaining muscles should be applied studiously. In this way patient will be ready for the prosthesis fitting. Because of this, It is highly recommended that amputees receive massage therapy in conjunction with begin-ning prosthetic training and ongoing prosthetic use.

1-Pain Control

Pain control is prerequisite to be able to switch to other rehabilitation activities. Pain due to tissue trauma and surgery usually recovers with wound healing and proper treatment.There may be also a therapy resisting pain type not related to tissue damage called phantom pain. Phantom limb pain refers to mild to extreme pain felt in the area where a limb has been amputated.

Experts report that residual limb massage, bandaging, starting earlier to exercise, using interim prosthesis and physical therapy are effective relieving the phantom pain. Besides patience and support, psychological support should be also taken.

During the first several months, the things that may increase the phantom pain are cold, heat, extremes in weather, stressful daily situations, depression, circulatory disorder in residual limb, infections (influenza, urinary system infection, etc).

The most important things you can do for avoiding pain is to clean your residual limb thoroughly every day and wear your prosthesis properly. Consult your doctor, if needed.

2- Skin and Scar Care

After removed the stitches, the residual limb must be washed daily using water and unscented skin friendly soap and rub down the residual limb with a rough towel. Light massage applied to residual limb helps regulation of circulation and normalization of skin sensitivity. Deep massage with small circular movements should be done to prevent excessive scar formation and tissue adhesion. Too much scar tissue is a major cause of pain. However as long as oedema continues deep massage must not be applied. Wounds took long to heal, patients with diabetes and circulatory disorders are at higher risk of wound infection. Some of these disorders (such as diabetes) impair the ability to feel pain and other sensations. People with such disorders should use special hygiene products. Many am- putees experience sensitive residual limbs or hypersensitivity of the effected limb . In this case with a moisturizing lotion (parfume and alcohol free, e.g Ottobock Derma Prevent) a light massage can be made. Also exercises made on residual limb with a very soft material (e.g. cottonwool) and depending on the condition of the skin, a rough and hard surfaced materials (e.g.brushes) regulates the blood circulation.

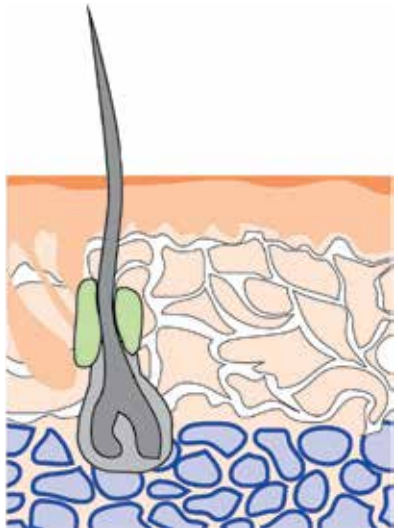
In early prosthetic fitting, prosthesis is worn 3-4 times per day that do not fade

within 15-20 minutes.

When you removed prosthesis and checked your skin, if there is no rubescence continues for more than five minutes, you can begin by wearing your prosthesis for 1 to 2 hours. Later on every two hours after the activities with the prosthesis (amount of weight- bearing, walking , and wearing time) carefully check the skin on your residual limb for any color or temperature changes, blisters, or abrasions. If your skin tolerates the prosthesis, it may be worn for greater lengths of time, but you must continue to remove it and check your skin at regular intervals.

Derma Skin Care Products

Perfect skin care



The epidermis is the barrier between our body and the environment. It is therefore the most important protection the body has against the outside world's harmful effects. To protect against pressure and friction, healthy skin is often thicker in certain areas, such as the palms of the hands and soles of the feet. The dermis contains blood vessels and nerves with special receptors that are sensitive, for example, to pressure, touch, pain, hot and cold, making the skin an important sensory organ. The subcutaneous tissue is primarily fatty tissue, along with larger blood vessels and thick nerve fibers. The hair roots are also found in this layer along with the sebaceous glands and sweat glands. When the epidermis is intact, the deeper layers of the skin are protected from chemicals and microorganisms.
For people wearing prostheses or orthoses, unavoidable mechanical stresses have adverse effects on the skin's function. There is often a close correlation between these causes and effects.
The main problems are:

- Pain with pressure and friction, soreness
- Build-up of perspiration and odour
- Damage to the skin's protective and immune functions
- Excessive hygiene or incorrect cleansing of the weakened skin

What you can do:
The Derma series offers a selection of skin care products that have been specially adapted to the needs of people who are wear ing prostheses or orthoses: DERMA CLEAN, DERMA PREVENT and DERMA REPAIR.

DERMACLEAN

Gently and safely

Anti-bacterial formula

Application:
Apply Derma Clean special cleansing lotion to the skin, rinse thoroughly with clear water after washing and dry.
To clean the liner, turn it inside out and wash with Derma Clean. Then rinse thoroughly with clear water and wipe with a clean, dry cloth. Now let the liner air dry.

DERMAPREVENT

- Prevents chafing
- Inhibits contact with external allergens
- Covers the skin with a protective coating
- Leaves the skin soft and supple
- Reduces odour by releasing active sub stance when needed

Application:
Apply Derma Prevent to the skin prior to donning the prosthesis or orthosis. Give a few drops on the palm of your hand and rub into the skin until it is dry. Shake well before using!

DERMAREPAIR

- Moisturizes dry and iritated skin
- Reduces the effects of excessive strain and soothes irritated skin
- Helps assist the skin's defense system against harmful environmental effects
- Makes the skin noticeably more supple and elastic

Application:
Use Derma Repair special basic skin care on a daily basis and generously apply it to dry, irritated skin after cleaning it with Derma Clean special cleansing lotion.
All Derma Skin Care Products are only intended for external use. Avoid any contact with the eyes and do not use in case of open wounds or infections. Dermatologist tested.

3- Shape of Residual Limb

Compression Stockings

Compression Bandage

Postoperative oedema, is a major problem that needs to be cope with. Oedema is a natural response of the body based on surgical operation and under normal conditions it gets better within 1-2 weeks. A compression sock, bandages and interim prosthesis should be use in this period for controlling oedema. Besides medical support, rest of residual limb above the heart level, lymph drainage massage, elastic bandage and compression socks applied by therapist are recommended in persis- tent oedemas. Elastic bandage application is a traditional method used in oedema treatment. First implemented by medical staff, then trans- ferred to patients or relatives by

teaching. If the bandage becomes loose, you should take it off and re-roll. Pressure should graduate from very firm at the end of your stump to moderate at the top of the bandaging. It is extremely important not to make the bandage too tight at the top. Never bandage your stump so tightly as to be painful as this may cause pressure are as or restrict blood flow. The bandage should be applied with the limb straight. If the limb is bent when bandaged, contractures may result. Compression socks are pro- duced seamless in various sizes. They are shaped like a sock and are pulled over your stump. If you are not using interim prosthesis, you should use compression socks for oedema treatment and blood circulation of residual limb.

4- Muscle Strengthening

You should start working with the muscles of the sound leg the day after the surgery in order to maintain and/or slowly rebuild the musculature. Muscles weaken due to pain, immobility and amputation. Therefore, strengthening the muscles should begin prior to prosthesis fitting. Each exercise should be done 2-3 times a day 10 repetitions each. You should pay attention not to hold your breath while exercising.

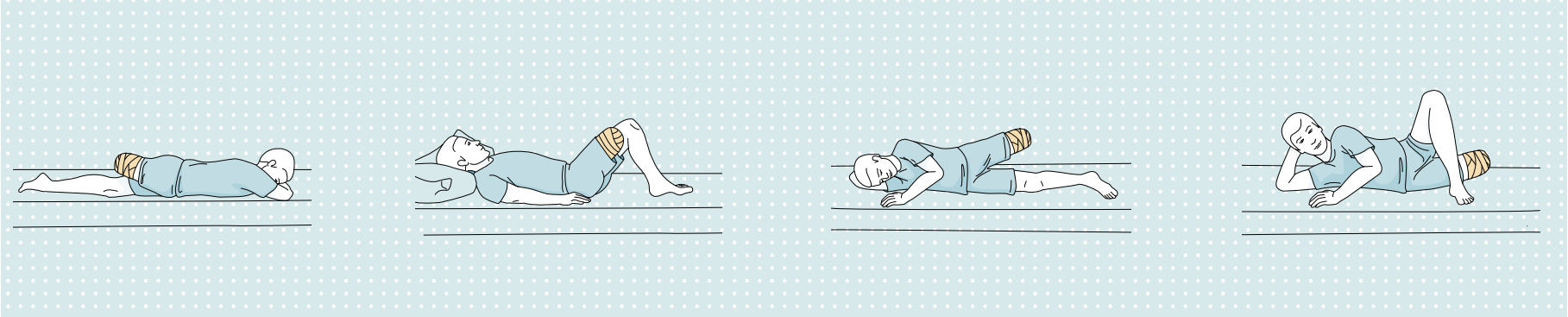
Basic exercises that should be applied after amputation :

In lying face down position amputated leg remains close to sound leg. Amputated leg is lifted as far as possible and kept here till count to 10. Slowly lowered. During this movement leg shouldn't be opened sideaways.

In lying on the back, sound leg is positioned in a flexed position and foot flat on the ground, amputated leg is extended. Amputated leg is lifted to knee level without bending and kept here till count to 10. Leg lowered slowly without bent.

In side-lying position amputated leg is above. Amputated leg is lifted 45-60 degree and kept here till count to 10 than lowered slowly. Head, trunk and leg should be on a line while lifting leg.

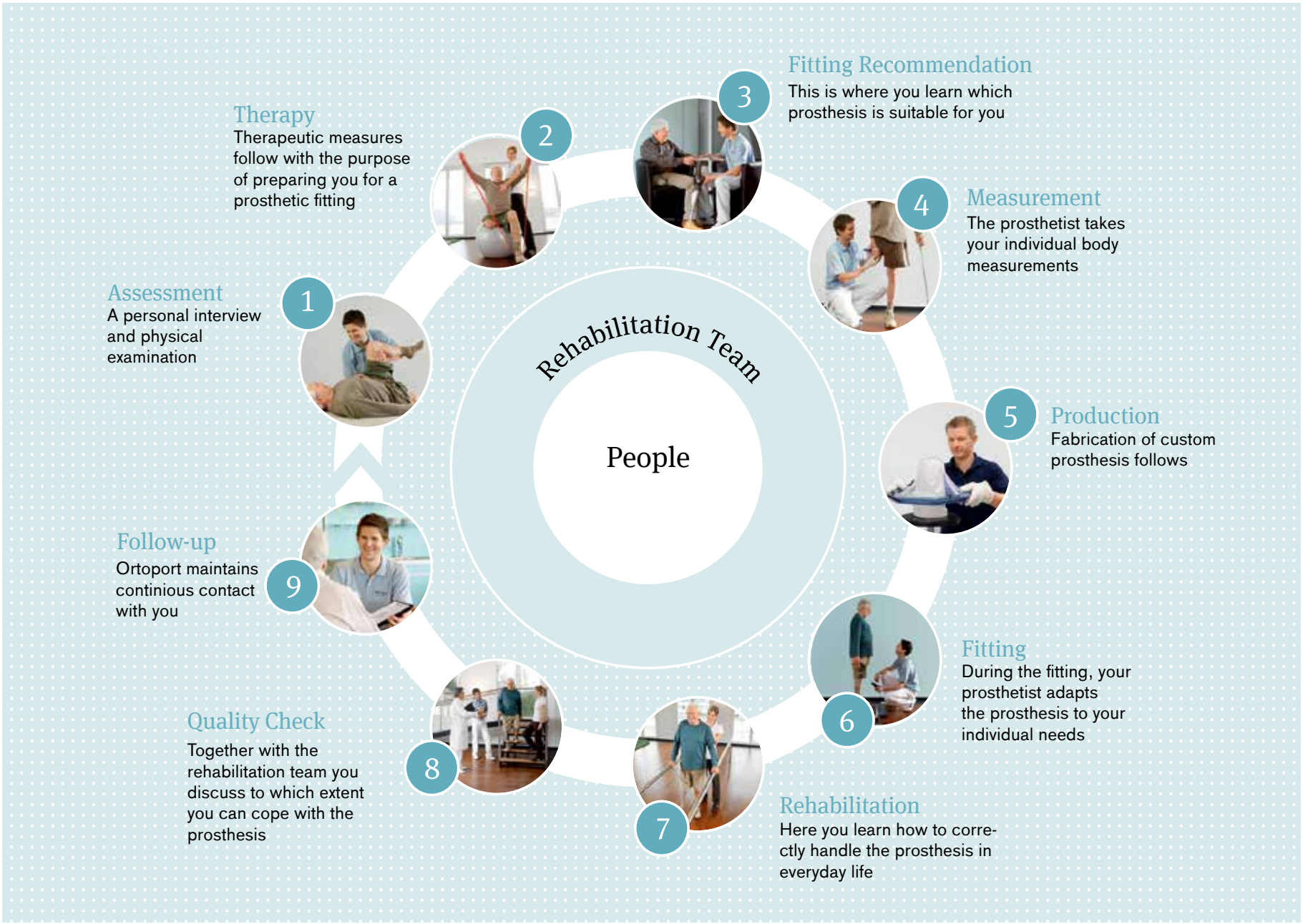
In side-lying position, amputted leg is below. In order to take support from sound leg, foot is set infront of the trunk, flat on the ground. Amputated leg is lifted straight without dislocating forward or backward and kept here till count to 10. Than lowered slowly.



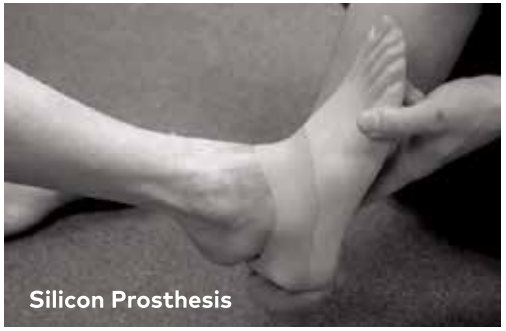
5- Rehabilitation

After transtibial amputation, when residual limb left free, hip joint moves forward, out and sideways; but knee joint tens to flexion. In this case knee shouldn't be positio- ned in a flexed position. If measures are not taken this situation settle into joints (arise contracture) and makes prosthetic fitting and walking difficult. To prevent this situation, regular body movements that will be shown by your physiotherapist should be started from the first day . Residual limb exercises that you will learn are effective to take proper oval shape of re- sidual limb, oedema control and nutrition of tissue. It will be useful lying face down on a flat surface 2-3 times per day for 15 minutes or 30 minutes 1-2 times. To increase the tension, a pillow can be placed under your thigh and a sand bag on the calf.

Strengthening exercises of arm and trunk should be started before surgery takes place and continued after prosthesis fitting also. These exercises are necessary for easy transfer from bed to chair and crutches also for gait training with prosthesis or without prosthesis. Besides these basic exercises it will be useful to apply exercises which are determined by your physiotherapist special for your case.


Rehabilitation Team
People
1
Assessment
A personal interview and physical examination
2
Therapy
Therapeutic measures follow with the purpose of preparing you for a prosthetic fitting
3
Fitting Recommendation
This is where you learn which prosthesis is suitable for you
4
Measurement
The prosthetist takes your individual body measurements
5
Production
Fabrication of custom prosthesis follows
6
Fitting
During the fitting, your prosthetist adapts the prosthesis to your individual needs
7
Rehabilitation
Here you learn how to correctly handle the prosthesis in everyday life
8
Quality Check
Together with the rehabilitation team you discuss to which extent you can cope with the prosthesis
9
Follow-up
Ortoport maintains continious contact with you

General Information



Silicon Prosthesis

Partial Foot Amputation and Prosthesis

Type of prosthesis for this type of amputation are usually made for cosmetic purposes. Lisfranc or Chopart amputated patients can stand up and walk indoors which provides convenience while taking a shower. At the same time they
feel the ground while walking, this situation allows the person to feel one's safer. The prosthetic socket contains the lower limb for Syme and Chopart amputations. The amputation related shortening of the residual limb allows the patient to use footsole under sound foot. Color and shape of the cosmetic prosthesis via Ottobock Silicon House® can be designed individually of your sound foot.
Finger, ear, nose and post-operative protective face mask with the same system is also made.

Syme Prostheses

Liner Materials

The liner acts as a sort of „second skin" between the movable soft tissue of the residual limb (muscles, tissue, skin) and the hard shell of the socket. This reduces movement and friction between the skin and prosthetic socket and therefore reduces the forces in the socket described earlier. Selecting the right liner is essential in order to ensure the prosthesis fits well and is comfortable to wear.

SILICON

is durable and easy to clean. The material provides high stability and good adhesion. Silicone is suitable for fittings on residual limbs with good soft tissue coverage. We recommend silicone liners for patients with a low to moderate mobility grade. SkinGuard technology which features antibacterial additive has been added to our transtibial and transfemoral liner portfolio.

COPOLYMER

is highly elastic. It contains skin-friendly white oil, making it especially suitable for residual limbs with dry skin. We recommend copolymer liners for patients with a low to moderate mobility grade.

POLYURETHANE

ensures even pressure distribution and offers a precise, comfortable fit. Very good dampening of impacts also make the material suitable for sensitive, bony and / or scarred residual limbs. We recommend polyurethane for patients with a low to especially high mobility grade. It is also possible to have custom-made transtibial and transfemoral polyurethane liners produced for unusal residual limb shapes.

Liner with pin lock




Liner with seal



Liner for transtibial




Suspension Systems

SHUTTLE –LOCK
(Pin System)

Pin is attached to the lower end of the liner. The pin is inser ted into a shuttle lock integrated into the socket , thereby connecting the resi-dual limb to the prosthesis. The system is easy to unlock using a simple mechanis

VACUUM SYSTEMS
Some of our suspension systems use vacuum technology. This removes excess air between the liner and socket, keeping the prosthesis securely in place. The vacuum is either generated by a valve (passive) or a pump (active). This system is suitable for transtibial and transfemoral fittings.

a-Passive Vacuum System:

Passive vacuum systems usually consist of a soft liner, a one-way valve and a sealing sleeve. Excess air is expelled through the valve with the help of body weight, and is unable to stream back in. The sealing sleeve creates an airtight seal at the top edge of the socket and th refore assures even adhesi n of the entire prosthetic socket. This assures security, stability, reduced pistoning and protection for you. This system is suitable for transtibial fittings.

b- Active Vacuum Systems:

Active Vacuum Systems such as the System work with a pump and an exhaust valve. The vacuum system is sealed on the outside by means of a sealing sleeve. Virtually all of the air between the liner and socket is removed and the system is active at every step, regulating the vacuum level within a defined range. This results in enhanced socket adhesion compared to valve fittings (passive vacuum systems). The System reduces shear forces in the socket, regulates the residual limb volume and improves circulation in the residual limb. The high level of adhesion makes it easier for the patient to perceive the surfaces he is walking on. This enhances safety in everyday life. Active Vacuum System is suitable for transtibial and transfemoral fittings.

Prosthetic Components and Functions

Revofit

Socket

Key of a successful prosthesis is, custommade socket, right suspension, appropriate liner and modular components for each patient's needs (foot, knee joint, adapter,...)

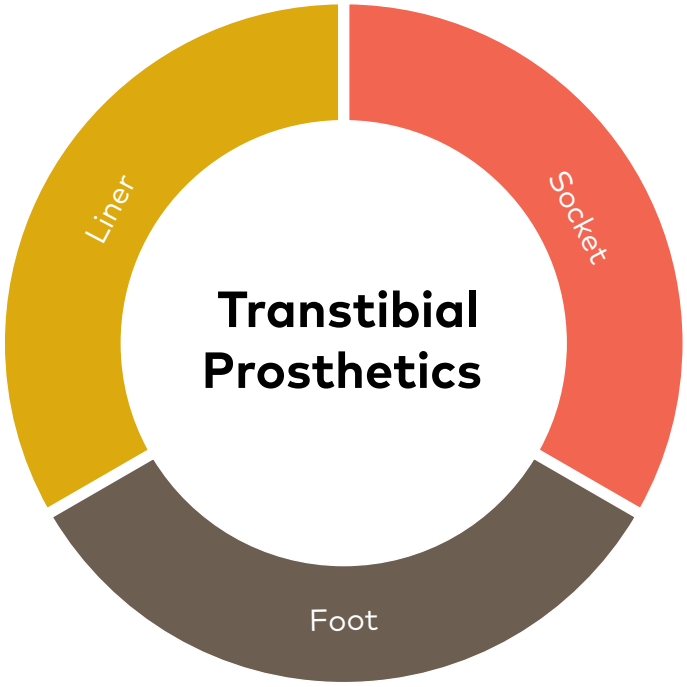
The prosthesic socket joins your residual limb to the prosthesis and fulfils important functions: It provides a secure connection and assures the proper fit of your prosthesis. In order to achieve these objectives, the prosthetic socket depending on the shape and condition of the residual limb and tailored to the respective mobility grade is individually fabricated for each patient.

It is typically made of a rigid material, the socalled „laminate".In recent years, it is also possible to design the rigid component as a frame and integrating a softer material into the rigid frame as the socket. Your prosthetist will inform you about the right combination of the socket design and other components.
The following examples are shown in the current prosthetic technology.

Flexible Inner Socket
It gets rid of cold sensation and provides more mobility. It minimises weakening of the muscles. It provides better adhesion between residual limb and the socket.

Socket Systems with Liner
Liner, reduces friction on the skin, provides comfort and improves skin condition. It provides good suspension control and provides scar tissue. Socket system with active vacuum regulates the residual limb volume and improves circulation. Thanks to the high level of adhesi- on, prosthesis wearer feels secure and comfortable.

RevoFit Socket System RevoFit Sockets are an alternative socket design using strategically-placed panels, laces and dials enabling amputees to adjust the fit of their sockets.
It starts with adjustable panels placed around the soft tissue areas of the limb. These panels are lined with padding and connected to a RevoFit™ dial that is easily turned to increase or decrease compression around the limb. Changes in activities, weight fluctuations, limb volume change - all of these can be accommodated for with an adjustable socket.



Transtibial Prosthetics

Liner

Dynamic Vacuum System Liner

- Skin Care and protection
- Maximum winding of different stubby shapes

Socket

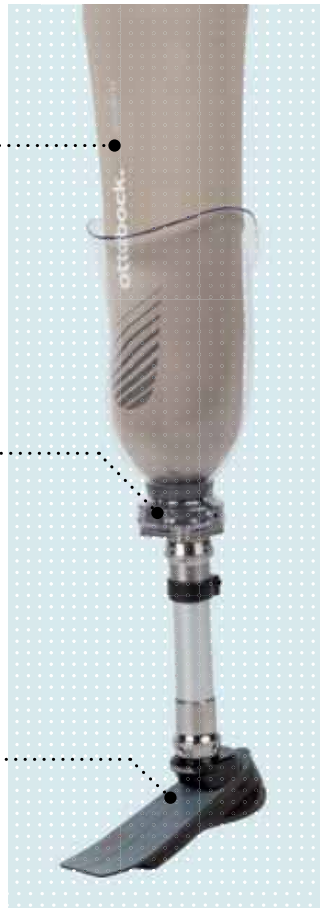
Dynamic Vacuum System

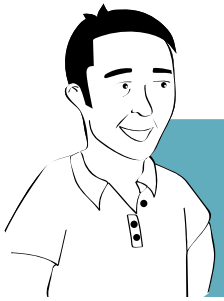
- Maximum suspension of different cadance

Foot

Terion K2 Carbon Foot

- Providing ground stability, including rough surface splash resistant to water and dirt





The following factors should be considered for diabetic patients in product selection.

- blood circulation
- stump sensitiveness
- skin features

Skeo Skinguard

- Antibacterial
- High durability and easy cleaning

Liner

KISS Lanyard System

- Easy donning
- Provides extra security with its special belt system

Socket

Pheon Knee Joint

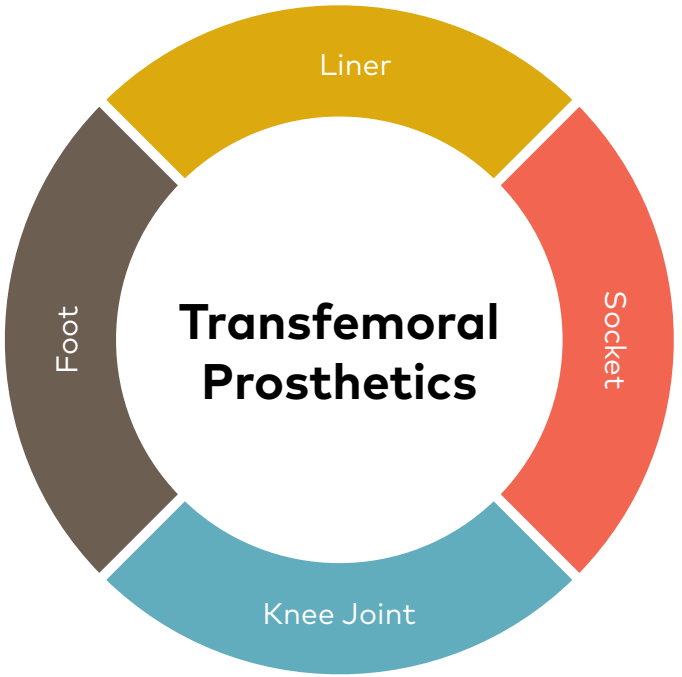
- High durability and safety
- Adjustability according to therapy level

Knee Joint

Terion K2 Carbon Foot

- Providing ground stability,
- Including rough surface splash resistant to water and dirt

Foot



Carbon Feet

1C60 TRITON FOOT:
-Clear plantar flexion at heel strike
-Excellent energy return
-Forefoot spring system adapts to surfaces extremely well for enhanced safety and stability while walking and standing
-Slim footshell (15 mm heel height) and normal footshell (10 mm heel height)
-Suitable for patients weighing up to 150 kg and Mobis 3-4

1C61 TRITON VERTICAL SHOCK:
The Triton Vertical Shock incorporates the innovative Triton design to a great extent. Furthermore, an integrated functional ring ensures enhanced shock absorption and torsion resistance. This additional functionality results in even better adaptation to uneven surfaces. Vertical and torsion forces are effectively reduced, resulting in noticeable relief for the user's residual limb. The Triton Vertical Shock is therefore especially well sui- ted for highly active users and sports activities.

1C62 HARMONY:
The Triton Harmony is also based on the basic Triton design. In addition, the highly functional, compact foot system is equipped with an integrated Harmony pump. In combination with the innovative Anatomic 3D PUR liner and the Derma ProFlex knee sleeve, the Triton Harmony makes it possible to fit transtibial amputees with an optimally coordina- ted system.The Harmony system permits the fabrica- tion of a socket system with increased negative pressure that supports stabilisation of the residual limb volume. Ad- hesion between the residual limb and the prosthesis is improved.

1C63 TRİTON LOW PROFİLE:
The Triton Low Profile makes the excellent functionality of the 1C60 Triton available even to users with limited space for integration.

1C64 TRİTON HEAVY DUTY
Like the other feet in the Triton family, the Triton Heavy Duty is also based on the basic 1C60 Triton design. Because a titanium adapter is used, it is especially sturdy and is suitable for users with mobility grade 3 and 4 up to a weight of 150 kg. Non-corrosive metal parts make the foot water-resistant as well.

TRIAS FOOT
-Lightweight carbon construction
-Unique interconnected dual spring elements providing elastic shock absorption at heel strike
-Secure, controlled move- ment patterns
-Adapts to various walking speeds without sacrificing comfort
-Reduces stress on the sound limb
-Provides excellent energy return
- Recommended for users with mobility grade 2 and 3
-The maximum allowable user weight is 125 kg.

TALEO
Ready for everyday life.
The Taleo prosthetic foot is designed for active individuals who navigate varied indoor and outdoor environments and place a high value on effortless walking and the ability to go wherever life takes them.
With Taleo, navigating everyday situations is easy because it feels natural and comfortable- so you can manage life on your terms.
• Smooth rollover
• Energy-efficient walking
• Adaptation to uneven surfaces
It's more than a foot, it's a foundation.

MERIDIUM
Reclaim your way.

Closer to the natural model than ever before
The new Meridium prosthetic foot offers you a high level of security along with increased adaptability and a more natural motion sequence. The unique 4-axis design with hydraulic real-time control therefore adjusts itself immediately to the user's walking speed and ground conditions, whether on slopes, stairs or varying terrain. When sitting, the complete foot lowers itself to the floor, which provides relief for the residual limb. Because of its automatic heel height adjustment, the Meridium is suitable for various types of shoes. The times when frequent shoe changes gave you a headache are a thing of the past. With the Meridium, you can quickly and easily adapt the heel height to your shoes, whatever the occasion.

Functions:

Ascending and descending slopes
Walking on uneven terrain
Going down stairs
Stable stance
Relief when sitting
Automatic heel height adjustment

Adapters

More mobility, safety, and comfort – the our adapters increase the level of wearer comfort and help you master everyday tasks more easily.

Rotation Adapter

Easily get into the car and drive away, put on shoes without any problems, or comfortably cross your legs with the Rotation Adapters become normal once again. Thanks to this adaper, seating position up to cross- legged position possible.

Upper Extremity Therapy and Rehabilitation

The most important goal of your entire treatment is to help you attain the most function and mobility possible, so you can lead an active life. On average, the rehabilitation process takes between two to six months, although this can be affected by various factors, including your level of motivation an how well your prosthesis fits.

Oedema Therapy

Initial swelling (oedema) is known to be a most common reaction to surgery.

With compression therapy the swelling of the residual limb can be reduced and the residual limb can be formed for the future prosthetic fitting.

Furthermore, it's important that you maintain the correct body posture so that your muscles and joints do not shorten or stiffen. Your nursing staff will explain the exact positioning for you.

Skin & Scar Care

Residual limb hygiene is very important in terms of wound healing. Daily washing of your limb using skin-friendly, unscented soap is essential.
Use a soft brush or a spikey massage ball to brush or tap the sensitive area.
You should also lotion your scar regularly with unscented creams in order to ensure that the scar tissue remains soft and elastic.

Physical training without your prosthesis

In order for your body to be well prepared for the next treatment steps and so that you remain mobile, exercises to stretch and strengthen the trunk, arm, and leg muscles are highly recommended.

Have your physical therapist show you exercises which support your recovery and also train the joints near the amputation location as much as possible.

Rehabilitation

During the whole rehabilitation process you will improve your physical condition to achieve the best results in your fitting.

With the support of your therapist, you learn the first crucial points about the use of your prosthesis. This includes how to put on the prosthesis and take it off properly, grasping and releasing different objects as well as exercising daily tasks.

Using the Prosthesis

Putting on and taking off

There are various ways to put on and take off a prosthesis, depending on the type of prosthesis and the characteristics of your residual limb. Another crucial aspect is whether the orthopaedic technology used for your treatment is unilateral or bilateral. Your therapist will show you what method is most suitable for you during training in the use of the prosthesis.
You can moisten the skin in the area of the electrodes a bit before putting on the prosthesis. This reduces the skin resistance and improves the conductivity between the muscles or skin and the electrodes in the prosthetic socket. Without moisture, it may take a moment to get a good contact so you can optimally control the prosthesis

Care and cleaning

Your prosthesis requires daily cleaning and care. Wipe the inner socket with a damp cloth to remove any remaining perspiration and skin particles. Also clean your prosthetic glove according to the care instructions and check it for cracks. You will need to get the prosthetic glove replaced if it has any cracks. If you wear a liner, please care for it daily according to the instructions for use.

Passive arm prostheses: provide the most natural possible appearance.

Body-powered arm prostheses: particularly robust and easy to handle.

Myoelectric arm prostheses: offer a high level of functionality.

Our services for you

• We offer you a comprehensive consultancy service with our expert orthopedic technicians and physiotherapists.

• We determine the prosthetic components according to your needs.

• With the rehabilitation program, we ensure that you use your prosthesis in the best way possible.

• We monitor the process by making checks at regular intervals after the application.

We are here for you

Our experienced team of orthopedic technicians and physiotherapists will be happy to provide you with information on all aspects of the application.

Contact us.

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