



ottobock.

Therapy and Rehabilitation for Arm Amputees

Individual preparation and training
at your Ottobock Competence Center

Quality for life

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We care for your mobility

Helping people maintain or regain their freedom of movement has been our main objective at Ottobock for over 90 years. As a manufacturer and supplier of technologically advanced services and products for people with limited mobility, we actively encourage an integrative approach in terms of therapy.

Having consulted with doctors, prosthetists, therapists, universities and other renowned institutions and taking into account our long-term experience in developing our products and services, we have developed an expertise that will grant you a thorough preparation for the prosthetic fitting.

Continuous qualification of our Ottobock Competence Center staff not only allows to expand our expertise, but offers you a maximum of mobility and independence through individual fitting solutions. In this way, we are able to offer you maximum mobility and independence through individual and innovative treatment solutions.

On your way to regain mobility

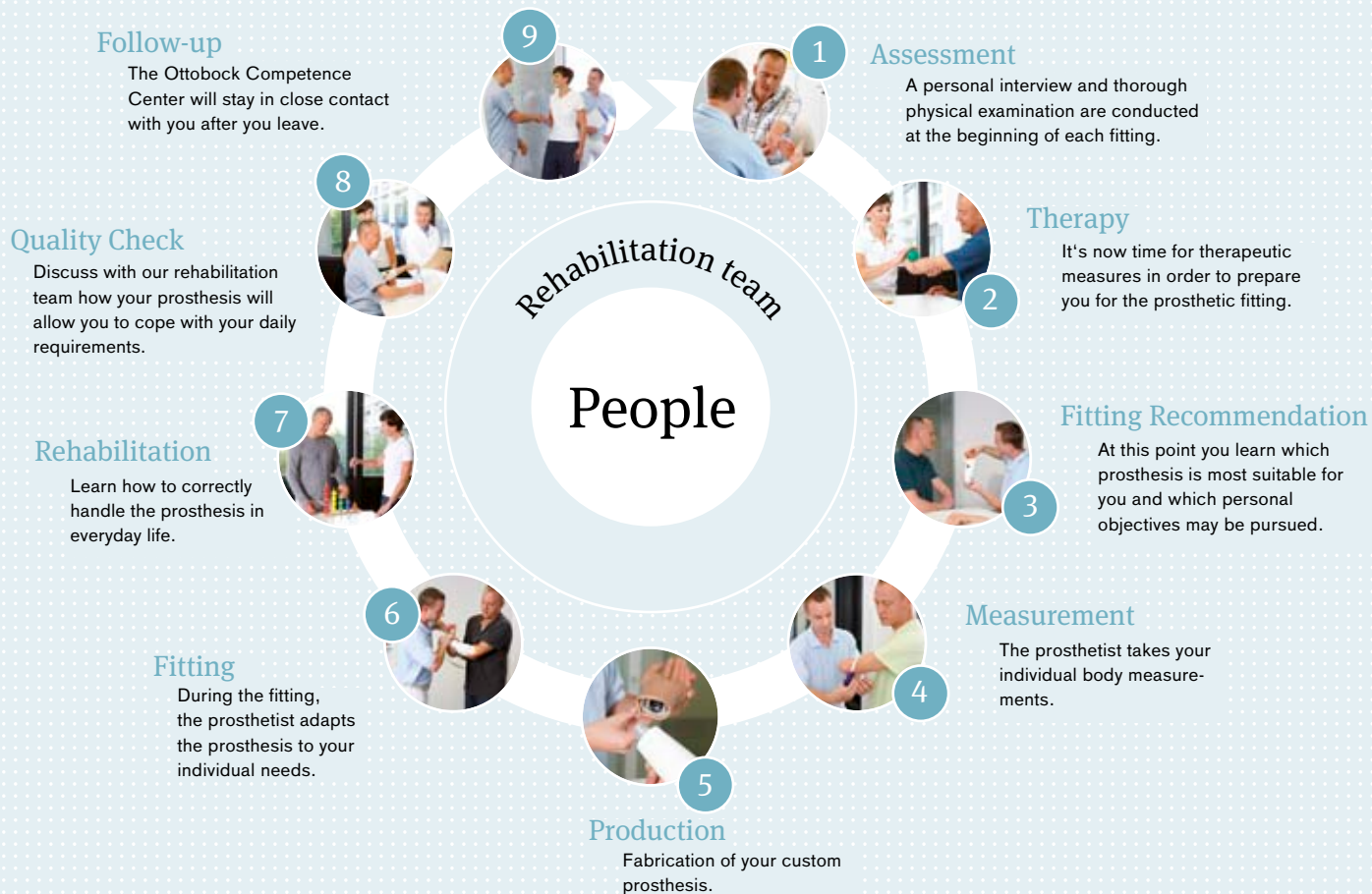
Focussing on restoring your mobility, we will provide you with some useful information that will help you to handle the new prosthesis. At our Ottobock Competence Center we want to make sure that you can go back to an independent way of life.

Please keep in mind that there is no fixed set of rules concerning the procedures and the duration of your rehabilitation process. The rehabilitation period depends on a variety of factors. Apart from the reason for your amputation and the question

whether it is your first fitting, your requirements, habits and personal motivation are important criteria as well.

The following pages will help you understand what to expect from the treatment circle.

Ottobock Treatment Circle



Therapy following your amputation

Instead of briefly looking at different amputation levels, we have decided to extensively focus on rehabilitation exercises for below elbow amputees. Please beware that these apply to above elbow amputees and other amputation levels as well. For more individual exercises we kindly ask you to consult your therapist.

Initial therapy measures begin shortly after the amputation. As soon as the surgical wound has healed well, the rehabilitation process including therapy, prosthetic fitting and prosthetic training can be initiated. As a first therapeutical step we are aiming to enhance your load-bearing ability, your pain resistance and the mobility of your residual limb. Even though your rehab team will strongly support your progress, your personal involvement

and motivation become most important during the therapeutical treatment progresses.

If you notice that certain measures displayed in this brochure are not part of your therapy, please talk to your rehabilitation team. Your therapists will be able to explain whether these measures are suitable for you.

1. Oedema Therapy

Initial swelling (oedema) of the residual limb (amputation side) tissue after surgery is known to be a most common reaction to surgery. It usually subsides after some weeks. The wound is generally dressed loosely until the removal of the stitches. Initially, pressure must not be applied to the residual limb. In order to allow the swelling to reduce as fast as possible, positioning the residual limb at heart level in the first few days following the surgery is important (1). Your nursing staff will explain the exact positioning for you.

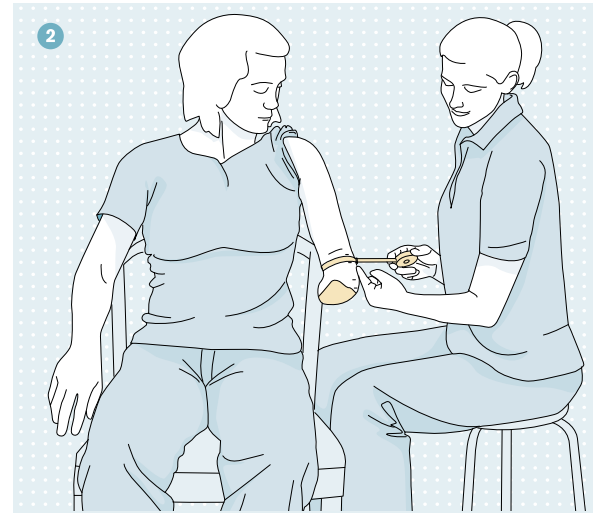
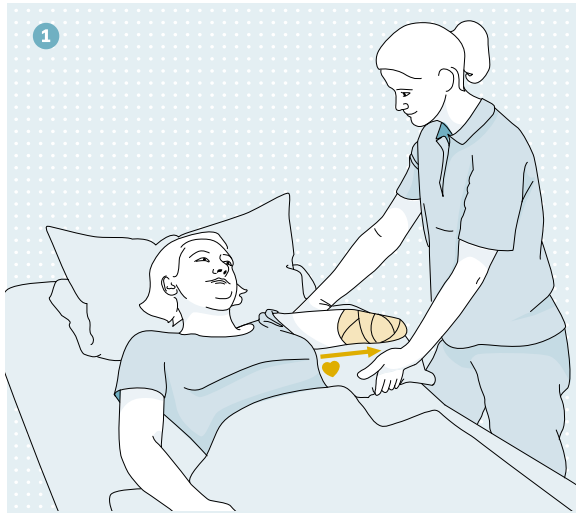
The limb's circumference has to be measured regularly in order to assess whether the swelling is subsiding. Please note that the same measuring points must be used every time in order to properly document the measuring results in the relevant forms (2). Otherwise, the results are not assimilable and have no significance as to determine whether the swelling has receded. If swelling of the residual limb persists, the wound cannot heal as efficiently, inevitably increasing the time period needed to allow before the fitting.

1.1. Positioning/Bedding

Starting at the hospital, a correct body posture is of great significance in order to avoid muscle shortening and stiffening of your joints. Undesirable stiffening might eventually prevent full use of your joints.

Most patients naturally assume that an elevated position free of pain, is the position to adapt to while

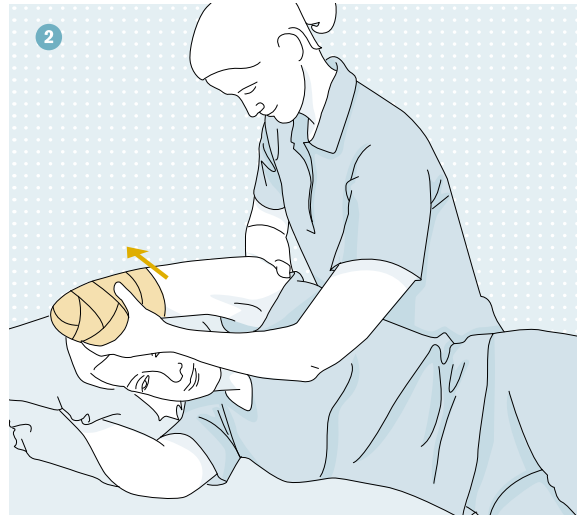
lying in bed. However, experience has shown that this is not always the case! In fact, your elbow joint should be extended as much as possible (1). Elevating your residual limb, e.g. on a cushion should only last for a few days. Your shoulder muscles will shorten, just as quickly as your residual limb mobility will be reduced.



1.2. Mobilisation

Make sure to move your residual limb several times during the day as this will prevent the remaining joints of your arm to lose mobility. Early mobilisation, e. g. while standing upright is important. It not only affects your circulation in a positive way, but will help you rebuild your sense of balance. Ask your therapist to show you some appropriate exercises.

The shoulder joint in particular needs to be mobilised as soon as possible, as it may otherwise partially stiffen and limit your movements (1, 2). A combination of proper positioning and mobilisation prepares your arm for wearing the prosthesis.



1.3. Early Compression Therapy and Lymphatic Drainage

Your initial wound dressing after the surgery will be changed frequently. This is followed by compression therapy and lymphatic drainage using a compression bandage or similar method. Your attending physician will determine the correct point in time to do so.

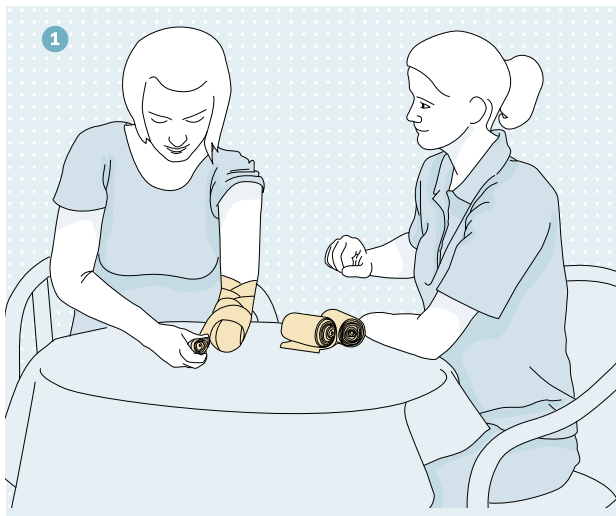
The purpose of compression therapy and lymphatic drainage is to continue in order to reduce the oedema and prepare your residual limb for your first prosthesis. Residual limb compression makes it easier for you to adapt to your prosthesis.

In addition, compression promotes the circulation in the residual limb which in turn reduces the pain and also benefits the healing process.

The manual lymphatic drainage is considered an important part of the oedema therapy. For this, your therapist carefully extends and gently massages your residual limb's skin in a special way in order to stimulate the lymphatic system underneath. The aim is to encourage the natural drainage and helps to circulate the pent-up liquid accumulated in the limb after surgery, circulate throughout the whole body.

Regular drainage helps to reduce the swelling of your residual limb more quickly.

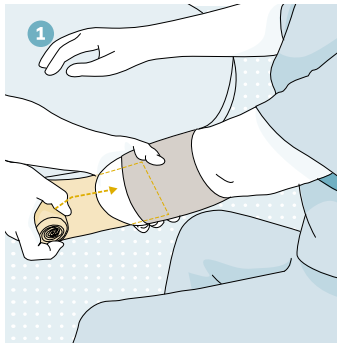
The illustrations show different compression therapy techniques: Wrapping the residual limb with a bandage (1 and next page) or silicone liner (page 16). The level of compression can be assessed based on skin colour or temperature. Please keep in mind that the bandage / the liner must be removed from time to time in order to check the residual limb, especially if there are circulatory problems or sensitivity disorders involved.



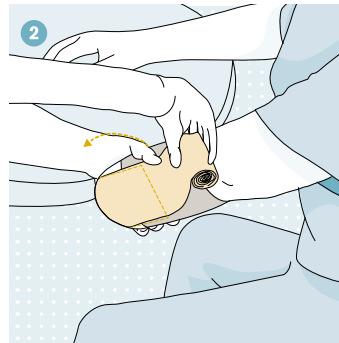
1.4. Compression Bandage

The compression bandage is used to apply a controlled amount of pressure. The bandage may either be applied by qualified staff or by the patient who was taught the wrapping technique beforehand (Figure 1–8). It might be necessary to use two bandages to wrap the whole residual limb and to apply the appropriate compression. You can use the

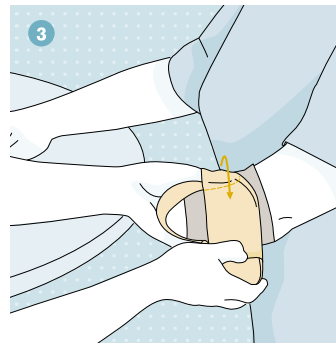
wrapping technique described below for the second bandage. It is important to avoid constriction of the residual limb by the bandage in order to prevent pain.



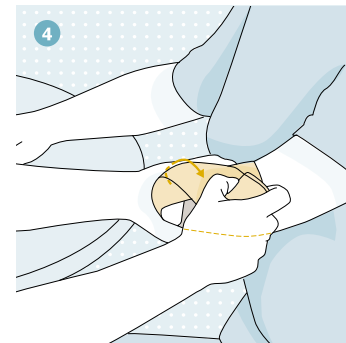
1. The compression bandage is used to apply a controlled amount of pressure. The bandage may either be applied by qualified staff or by the patient who was taught the wrapping technique beforehand.



2. Then pull the bandage from the back of the residual limb to the front and start to wrap it around.



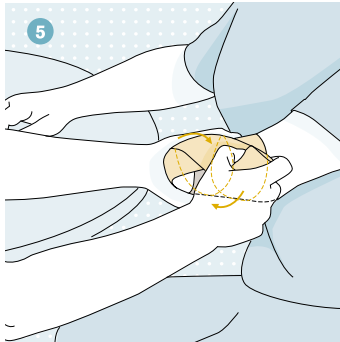
3. To fix the first layer, keep a tight hold on the bandage with one hand and fold it down with the other.



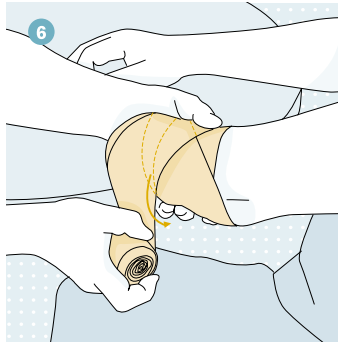
4. While applying the bandage, beware that pressure should be most intense at the end of the residual limb and gradually decrease towards the body.

What you need:

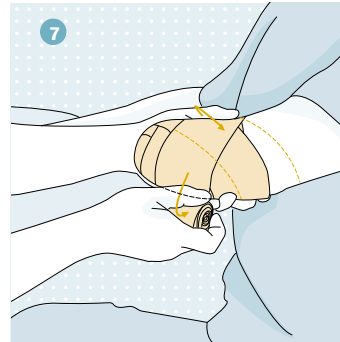
1. Cohesive conforming bandage
 2. Compression bandage
 3. Tape
 4. Scissors
-



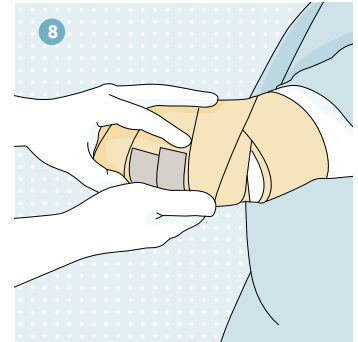
5. Pull the compression bandage tight, while wrapping it behind the residual limb...



6. ... and lay it more loosely while wrapping it towards the front of the limb.



7. Continue to bandage diagonally imitating the figure 8.

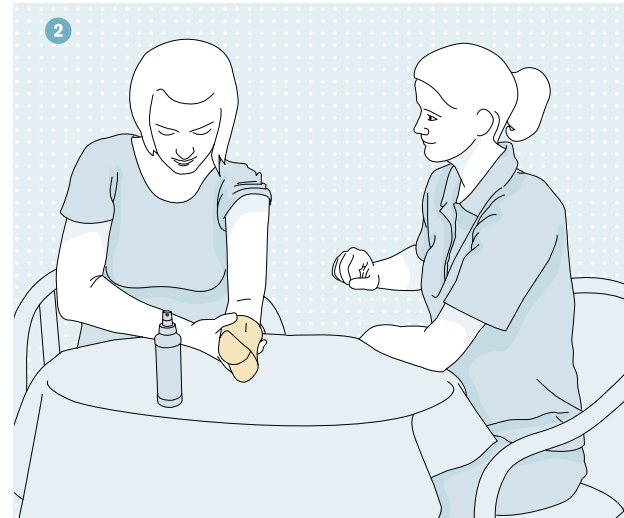
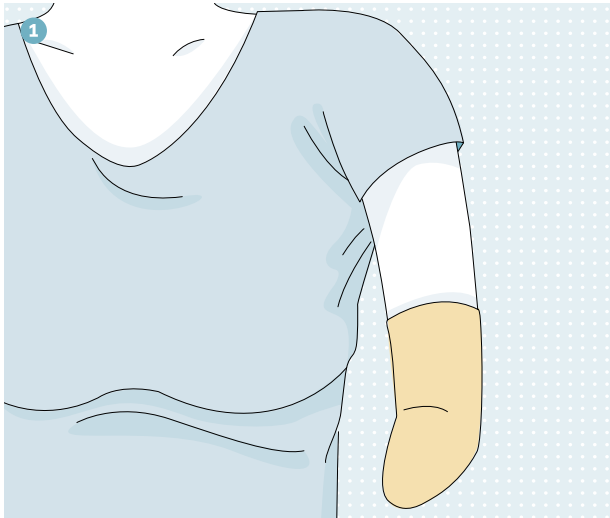


8. Making sure to bandage as high as possible, you might even need more than one bandage. When finished, use tape to hold the end of the elastic bandage in place.

1.5. Silicone Liners

Alternatively to bandages, silicone liners can be a quick and easy solution to use for compression therapy. Although the pressure strength cannot be as individually adapted as with a compression bandage. You will find a selection of different prefabricated sizes available. In order to generate a consistent and even pressure, it is important to ensure that no air is trapped between the end of the residual limb and the liner (1,2)! Initially you may experience increased perspiration

inside the liner. Be assured that this inconvenience is self-correcting once you get used to wearing the liner. In order to prevent possible skin irritation, you may apply Ottobock Procomfort Gel to the skin of the residual limb near the brim of the liner. Cleaning the silicone liner after each use, is also very important. For more information, please consult the liner instruction.



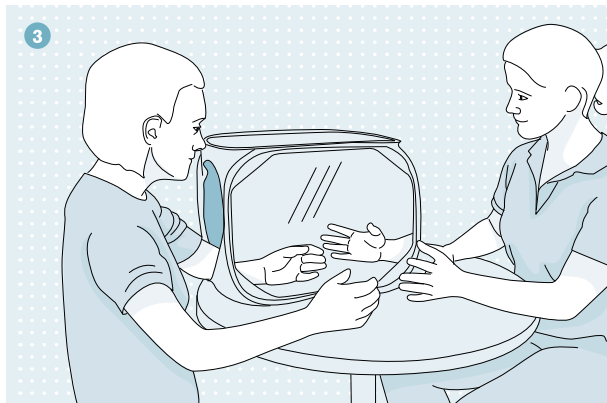
1.6. Additional Compression Therapy

Once the volume of your residual limb is no longer decreasing and the scar has healed well, your clinician will approve of the fitting process to be started. As soon as the residual limb volume has stabilised over an extended period of time, the prosthetic fitting process can begin. Compression should be continuously maintained up to this point. Your rehabilitation team will show you or your family how you can do this yourself. If you only wear your prosthesis for short periods of time at the beginning of the fitting process (e. g. for fittings at our Center), you should continue wearing your compression bandage or liner the rest of the day. Once you start wearing your prosthesis for extended periods of time, additional compression is normally no longer required.

1.7. Phantom Pain and Mirror Therapy

After losing a limb, quite a few patients experience what is known as phantom pain. The pain is known to recede over time or following the prosthetic fitting. Some patients nevertheless complain about ongoing pain inspite of medical treatment. The so-called mirror therapy is well suited to overcome or significantly reduce the pain.

Initially guided by a therapist, the training should eventually be conducted by the patient himself. The procedure is simple: The patient is placed next to a mirror hiding the residual limb behind it (3). The amputee then concentrates on his/her non-affected arm during different sensory exercises and due to the reflection he imagines both arms moving. According to the neuroscientist and inventor of mirror therapy Vilayanur S. Ramachandran using a mirror enables amputees to superimpose the visual image of their sound limb on the location where they perceive their phantom limb to exist. Patients having undergone mirror therapy, found that their phantom pain experienced rapid relief.



2. Skin Care and Scar Treatment

The skin on the residual limb is often very sensitive following the surgery. There are ways to reduce these sensations. Use a soft brush or a spikey massage ball to brush or tap the sensitive area (1, 2). This decreases hyper sensitivity. You can also rub the residual limb with a rough towel or a dry washcloth (3). Rubbing your residual limb in an upward motion from its end towards your body, you should feel comfortable with the fabrics.

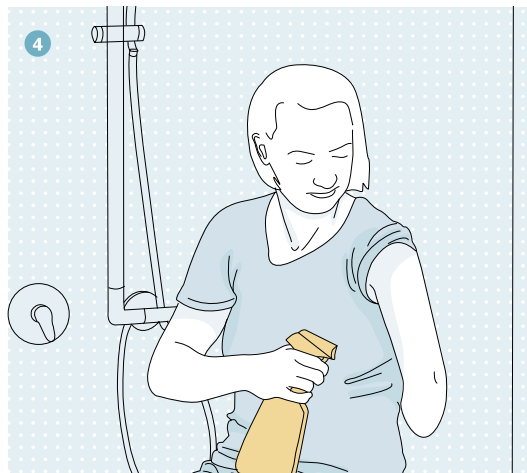
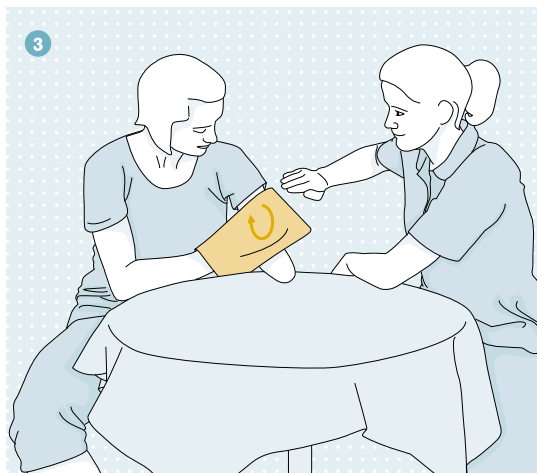
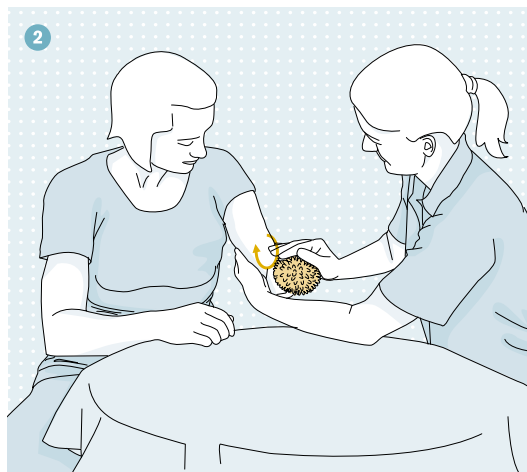
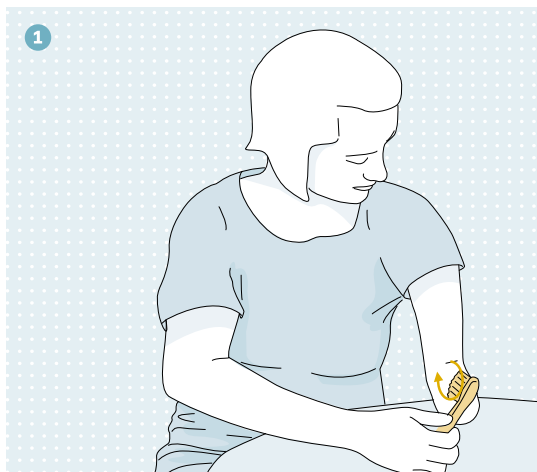
Residual limb hygiene is very important in terms of wound healing. Daily washing of your limb using skin-friendly, unscented soap is essential. Ottobock offers a variety of skincare products designed to facilitate the cleaning procedure. Ottobock care products are designed to make residual limb care and cleaning easier (4).

2.1. Scar Treatment

In most cases, the surgical wound closes within the first three to four weeks and a scar is formed. Even if

the scar appears to have healed well from the outside and the appearance of the scar tissue appears to remain constant, the overall scar healing underneath your skin can take up to 18 months. Since scar tissue often lacks the ability to produce its own oils, we recommend that you start moisturising your scar soon after the surgery. Unscented lotions are highly recommended.

As an important step in regard to your fitting preparation, you will be taught to clean, moisturise and massage your own skin by your therapist. The more flexible and soft your scar is, the better it is prepared for the fitting. Such intensive care is important in order to ensure that the scar tissue remains soft and elastic while becoming resilient at the same time. This allows for more comfort when wearing your prosthesis at a later stage. Early compression therapy is also important in terms of scarring. Full-coverage compression of the whole residual limb either with bandages or with silicone liners is the best way to prevent the development of excessive scar tissue.



3. Physical Training without your Prosthesis

Physical Training

Build up fitness for the prosthetic fitting

1 - Controls Training

Get to know the functions of the prosthesis

2 - Repetitive Drills

Repeat exercises to master your prosthesis

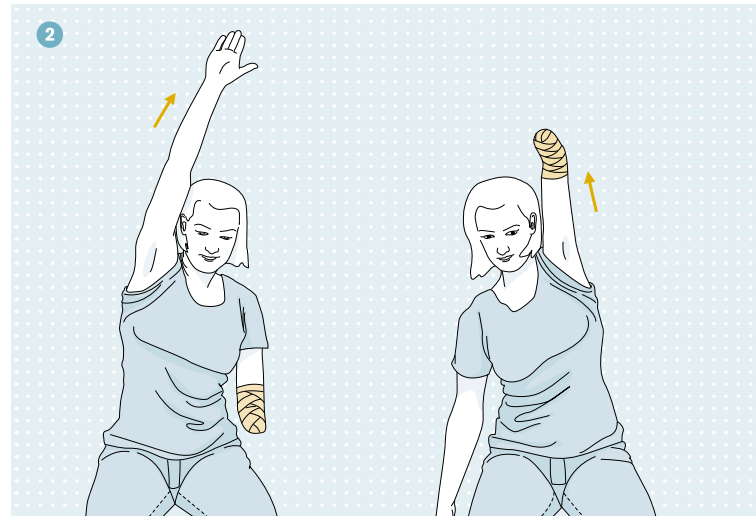
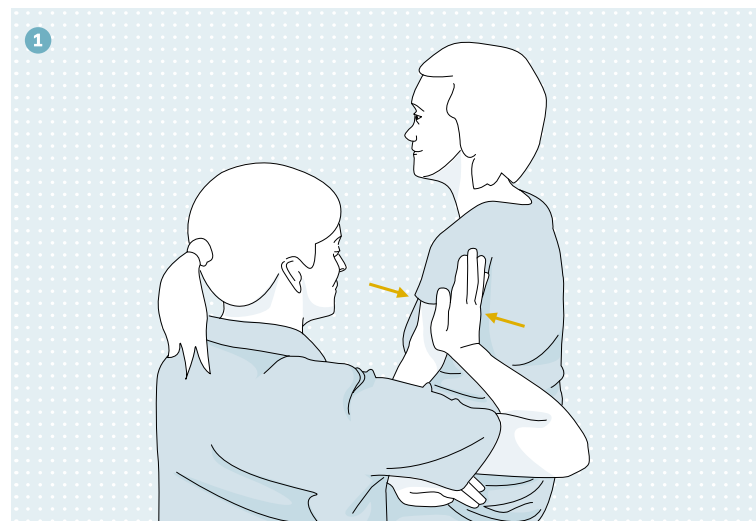
3 - ADL Training

Learn to use your prosthesis in everyday life

The activities described in this section can be completed before you receive your prosthesis. This preparatory training strengthens the torso musculature including those of your abdomen and back, as well as the sound arm and the legs. But don't forget to also include your residual limb in your exercises.

3.1. Stretching the Residual Limb Musculature

The muscles and joints around your residual limb need stretching (1, 2). Maintaining or regaining maximum shoulder joint mobility in all directions of movement is very important in order to ensure in order to ensure grasping and holding movements with your prosthesis in no time.

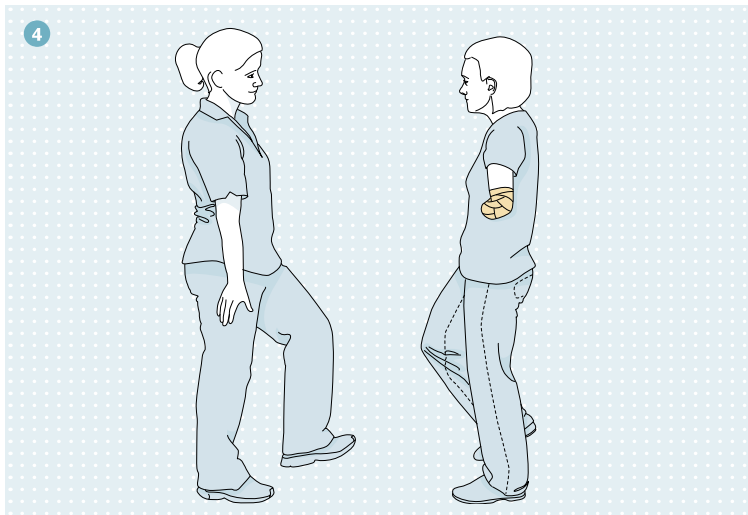


3.2. Muscle Strengthening on the Sound Side

Start working the muscles on your sound side right after surgery in order to maintain and / or slowly rebuild the strength. Depending on whether your dominant or less dominant hand was affected, your sound side will have to undergo fairly intensive training as well.

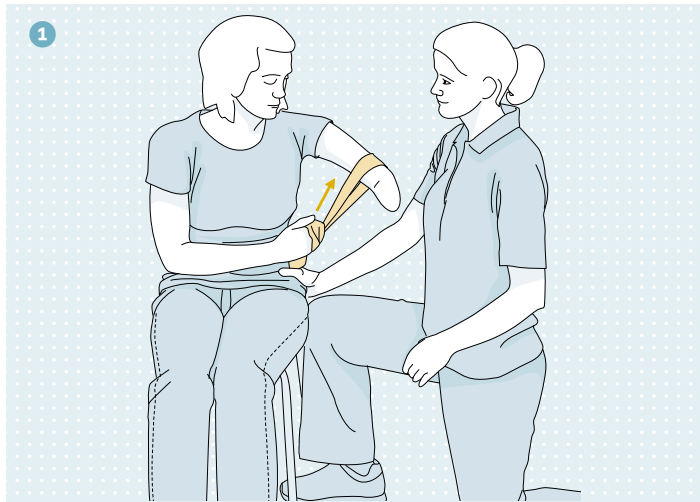
3.3. Improving Dexterity and Balance Training

Fine motor skills, dexterity and strength buildup need to be trained. The more dextrous you are with your sound hand, the greater your independence in performing daily activities. You can train your skills easily with everyday objects like toothpaste tubes. (3). In particular, you should practise challenging activities, such as writing or brushing your teeth. In addition to muscle and dexterity training, balance training is an important part to get used to the new situation (4).



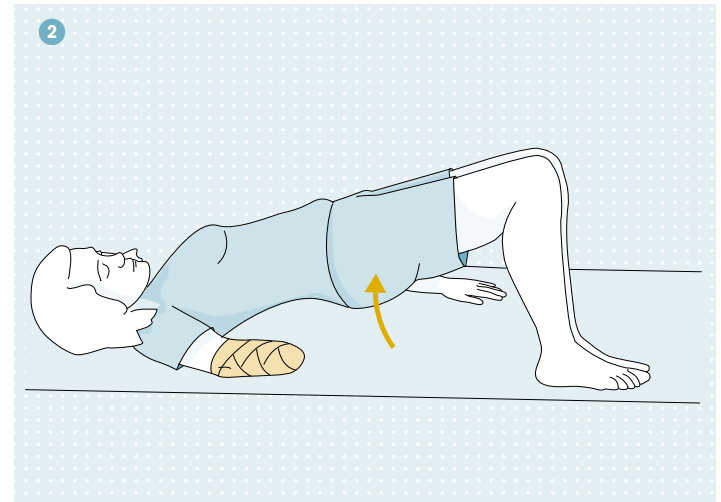
3.4. Muscle Strengthening of Residual Limb

The purpose of residual limb muscle development training is to improve the mobility of the remaining joints and strengthen the musculature. Start exercising your residual limb musculature within a few days after your surgery. Exercises that serve to build up strength can be conducted with light weights or elastic straps (1).



3.5. Muscle Strengthening of Torso

Moving your upper body is particularly important after the amputation. In doing so, avoid excessive twisting of the spinal column. Your centre of gravity will change due to the spinal column statics after losing a limb. In order to avoid further misalignment and subsequent pain, it is essential to strengthen your back. Once you start wearing the prosthesis, its weight compensates for the loss of mass. If malpositions have already developed, special exercises can be used to adjust or prevent further progression. A stable and balanced torso will make it easier to control your prosthesis (2).



“Arriving at one goal is the
starting point to another.”

John Dewey

– Keep on going!

Rehabilitation in the Competence Center.

Welcome to Ottobock!

In this section, you will learn what to expect during the rehabilitation process at our Center. Before the prosthetic fitting and rehabilitation process begins, our team of experts will examine your physical situation in detail. Subsequently we will discuss your personal objectives in order to design your individual rehab programme.

At this point you are ready for the fitting process. During the whole rehabilitation process you will improve your physical condition to achieve the best results in your fitting. Controls training, repetitive drills and finally ADL training (activities of daily living) will teach you how to use your new prosthesis to its full potential.

In order to fit you with a solution suiting your individual needs, a certified prosthetist will be at

your side during the whole fitting process. 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. The prosthetic components chosen are of great significance as your rehabilitation programme is tailored to match them.

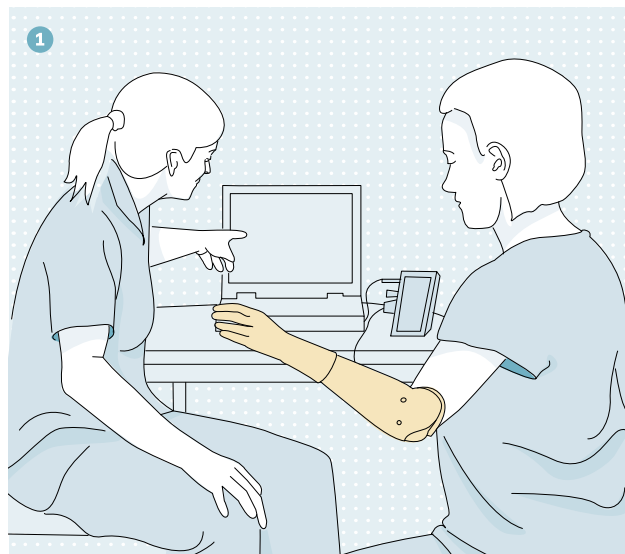


4. Using the prosthesis

4.1. Myotest and Myotraining

Some modern myoelectric prostheses allow you a targeted approach to grasping objects. The relevant commands for these movements are transmitted to the prosthesis by your residual limb musculature. A procedure known as Myotest is used to measure the stimulus by determining the optimal positioning of the electrodes and the signal strength.

The Myotest will be followed by the so-called Myotraining. Your orthopaedic expert will for example ask you to strain a particular muscle in order to open your hand. Known as myoelectric control, the procedure is supported by a computer simulation used to visualise motor functions. Based on the Myotest results and on subsequent myotraining, our experts will help you choose the prosthetic components suiting you best. Eventually the software controlling your final prosthesis will be programmed accordingly (1).



4.2. Correct Donning and Doffing

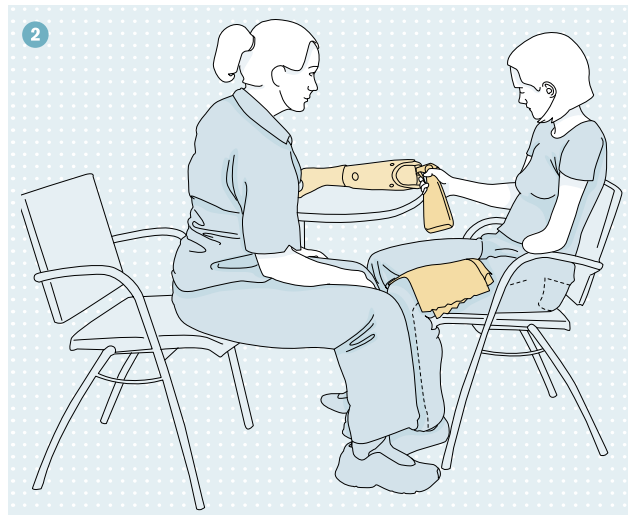
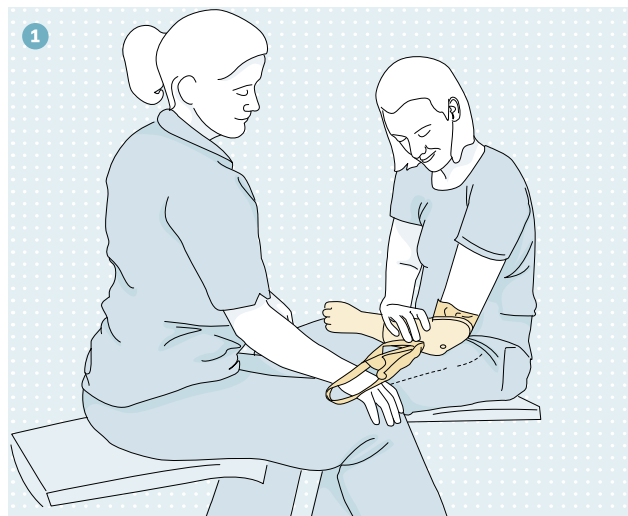
There are various ways to put on and take off your prosthesis depending on the type of prosthesis and the characteristics of your residual limb. Whether you have prosthetic fittings on one or both sides is a crucial point. As you learn how to handle the prosthesis, your therapist will show you which method is suitable for you (1).

You may moisturise your skin lightly before putting on the prosthesis. This reduces skin resistance and improves conductivity between the muscles or the skin and electrodes in the prosthetic socket. Without moisture, it may take a moment before you achieve good contact between your skin and the electrodes which is necessary in order to achieve optimum control over your prosthesis.

4.3. Cleaning the Prosthesis

You have already learned how to care for your residual limb. The prosthesis also has to be cleaned and cared for on a daily basis (2). In order to remove residue from perspiration and skin particles, we recommend to regularly wipe the inner socket of the prosthesis with a damp cloth. Proceed likewise with your prosthetic glove according to the care instructions and examine it for ruptures. If there are any, the glove needs to be replaced.

If you are used to wearing a liner, daily care according to the instructions is essential.



Every single exercise is crucial
for your individual progress

5. Training with your Prosthesis

Physical Training

1 - Controls Training

2

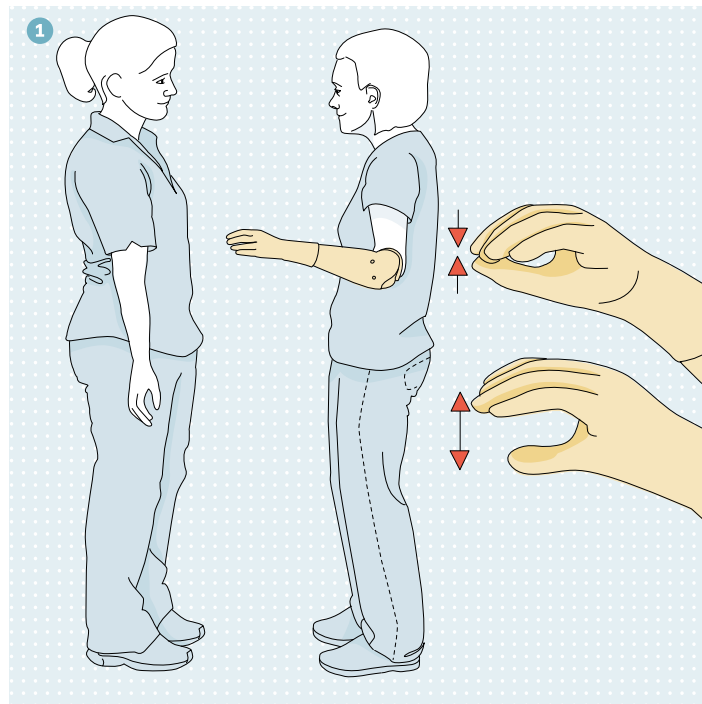
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5.1. Physical Training with Prosthesis

Since an arm amputation always affects the sense of balance as well, you will undergo balance and coordination training. In terms of coordination training, practising coordination between the eye and prosthetic hand is especially important, since your lack of sensation will be substituted by visual control.

5.2. Controls Training

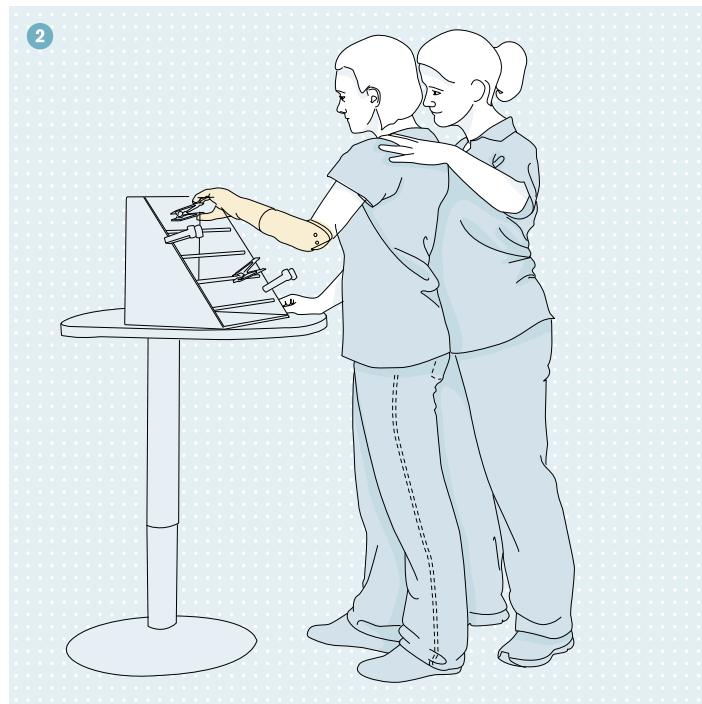
You will be familiarised with the functions of your prosthesis after it is fabricated. Depending on the components used in your prosthesis, you now learn how to open and close the hand and rotate it inwardly and outwardly. Interchanging components will also be part of your training (1).



5.3. Repetitive Drills

Automising the processes as best as possible, will free your mind from constant worries about how to control your prosthesis. That is how these processes – as far as possible – are automated so that you do not have to think about controlling the prosthesis as much and develop endurance in tensing your musculature.

Suitable exercise accessories include cones, various peg board games or a pinch tree with individual pegs (2), which can be changed in their vertical or horizontal positions. Rotating them, helps you to adapt your gripping pattern to the changing conditions.

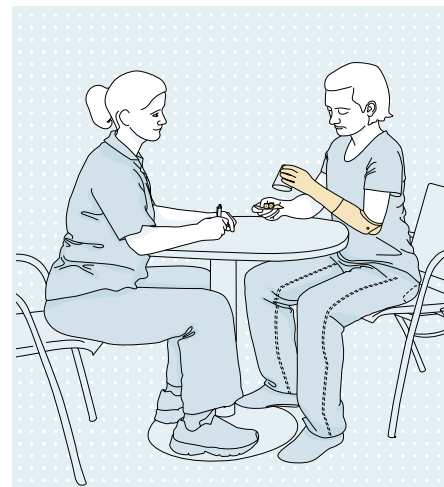
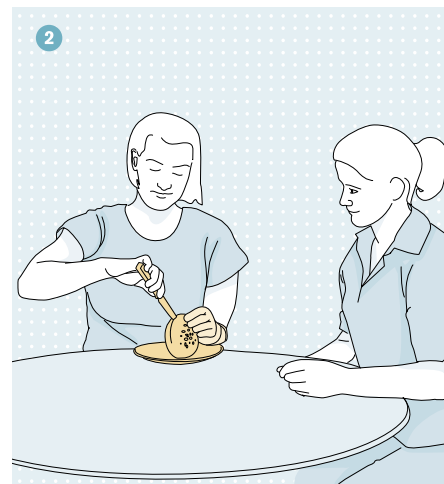


5.4. Activities of Daily Living (ADL)

After controls and repetitive training, you are well prepared for the more complex movement patterns to follow.

ADL training is tailored to your personal needs. The exercises are selected according to what is important to you at work or when performing your daily activities.

Simpler activities like folding a towel are meant to introduce you to more challenging tasks like preparing a meal. Training may also include getting dressed and undressed; opening a bottle and pouring a drink (1) and using items at the office. Being able to eat on your own, by using a knife and fork, is considered a major step towards regaining your independence (2). You might be surprised how much assistance your new prosthesis offers.



6. Assistive Device Consulting

If you experience difficulties with your new prosthesis while performing certain activities, supporting devices may be used to increase your independence. Your therapist may determine whether grabbing aids like tweezers are an option for you.

However, the “less is more” rule applies to all devices; the fewer devices you need, the greater your day-to-day independence.

7. Leisure and Sports

Your prosthesis opens up new options for leisure activities. Since physical activity is beneficial for your overall fitness, you should include it in your everyday life. Please talk to your therapist.

We hope we have provided you with comprehensive information and wish you all the best for your upcoming rehabilitation. At Ottobock we will do everything we can to help you restore your mobility and confidence.



Your requirements are our driving force

Apart from having an appropriate device, therapy and rehabilitation are crucial for your fitting success. Through our pre and post fitting therapy programs we strive to meet your needs and expectations.

Having provided you with comprehensive information throughout this brochure, we wish you a most successful rehabilitation.

If you have any questions or proposals, please feel free to contact us anytime. You can count on us to provide continuous advice and follow-up care. Please feel welcome to visit our Center anytime after your fitting.

Please contact us for an individual consultation

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