

# Within Reach

**The Rehabilitation  
Journey After Upper  
Limb Amputation**



## My Personal Record

Name: \_\_\_\_\_

Date of Surgery: \_\_\_\_\_

Surgeon: \_\_\_\_\_

Primary care doctor: \_\_\_\_\_

Rehabilitation doctor: \_\_\_\_\_

Nurses: \_\_\_\_\_

Occupational therapist: \_\_\_\_\_

Physical therapist: \_\_\_\_\_

Kinesiotherapist: \_\_\_\_\_

Prosthetist: \_\_\_\_\_

Social worker: \_\_\_\_\_

Psychologist/Psychiatrist: \_\_\_\_\_

Counselor: \_\_\_\_\_

Peer visitor: \_\_\_\_\_

Others: \_\_\_\_\_



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# Introduction

There are nearly two million Americans living with limb loss. About a third of those individuals have upper limb amputations. However, only one of ten people with upper limb amputation is at a level that includes at least the entire hand. The rarity of upper limb amputation makes it challenging to find the right information. A collaboration of Rehabilitation Specialists and members of Healthcare Teams from the Department of Veterans Affairs (VA) and the Department of Defense (DoD) have written this handbook to help the individual with limb loss through the rehabilitation process and to answer questions about living with an amputation. This book is based on the VA/DoD Upper Limb Amputation Rehabilitation (ULAR) Clinical Practice Guideline (CPG) which describes the best methods for treating Veterans and Service members with amputation. This CPG is based on the latest research and expert opinion, and is designed to guide Healthcare Teams in providing the best possible care.

Each amputation is unique, as are the reactions to it, but there are common challenges that are addressed in this text. The aim of this book is to provide assistance and help make the rehabilitation journey easier. The information here will help when you are met with individual challenges that lay ahead, and maybe more importantly, provide guidance on where to find needed support.

This guide was written specifically for Veterans and active duty military personnel receiving care through the Department of Veterans Affairs and Department of Defense Healthcare Systems, but the information gathered includes civilian experiences with amputation. The hope is that this content can benefit anyone living with upper limb amputation as well as caregivers and clinical providers.

The text has been divided into several chapters that focus on the major goals and challenges faced during the progression through the rehabilitation process. It will cover many topics including living with and without a prosthesis. This book is not meant to answer specific medical questions, and it is recommended you have ongoing discussions about specific medical concerns with your doctor or Healthcare Team.

If you are newly living with limb loss, the overview should provide the most immediate information. The following chapters will be useful during the progression of recovery and rehabilitation.

You are encouraged to explore the websites listed in the Resources chapter, as it also includes contact information for various organizations that can be helpful to amputees in various stages of the rehabilitation process.

There is a glossary to help explain terminology used that may be unfamiliar. The glossary can also be a guide to some of technical jargon, as that same terminology will likely be used by your Healthcare Team.

The physician, prosthetist, rehabilitation therapists and all members of the Healthcare Team are your ultimate resource to answer questions about the topics covered in this guide. Communication with your Healthcare Team is a crucial tool for success, and the Veteran or Service member is the central member of this team. Your questions, needs, and goals are what drive the rehabilitation process.

Questions you may want to have answers to, prior to being discharged from the hospital include:

1. How do I care for my wound and dressing once I'm home?
2. How will I know if I'm healing properly? How do I identify an infection? How do I promote quicker healing?
3. How much and how often should I be taking prescribed medications?
4. Are there exercises or techniques that I can use to help with pain?
5. What mental health support is available specifically for patients with limb loss?
6. Where can I find information on peer support? Family support? Are there local groups that are designed to support a person like me?
7. Will I get a prosthesis? How do I reach my prosthetist?
8. How do I get Occupational and/or Physical Therapy?
9. Where am I going next? What do I need to schedule?

Other questions you may have:

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# 1 The Rehabilitation Journey

## 1.1 The Goals of Rehabilitation Care

Successful rehabilitation is influenced by a variety of factors including your level of amputation, mental well-being, physical conditioning, diet, social support, psychological factors, and motivation.

The primary goal of your rehabilitation is to optimize your overall health, independence in your daily activities, and quality of life. Determine what your personal goals are and discuss with your healthcare team to make a long term plan.

Other goals of amputation rehabilitation include:

- Reduce pain in your residual limb
- Prevent overuse injuries that sometimes occur in the non-amputated limb
- Improve and maintain physical health
- Become independent and safe in self-care, work, and recreational/leisure activities
- Improve ability to access the community
- Provide support for psychological and emotional well-being
- Address factors that impact quality of life
- Facilitate healthy body image and self-esteem
- Optimize quality of lifelong care

## 1.2 The Phases of Rehabilitation Care

There are four phases of rehabilitation care that you will progress through following an upper limb amputation. The four phases are:

- Perioperative
- Pre-prosthetic
- Prosthetic Training
- Lifelong Care

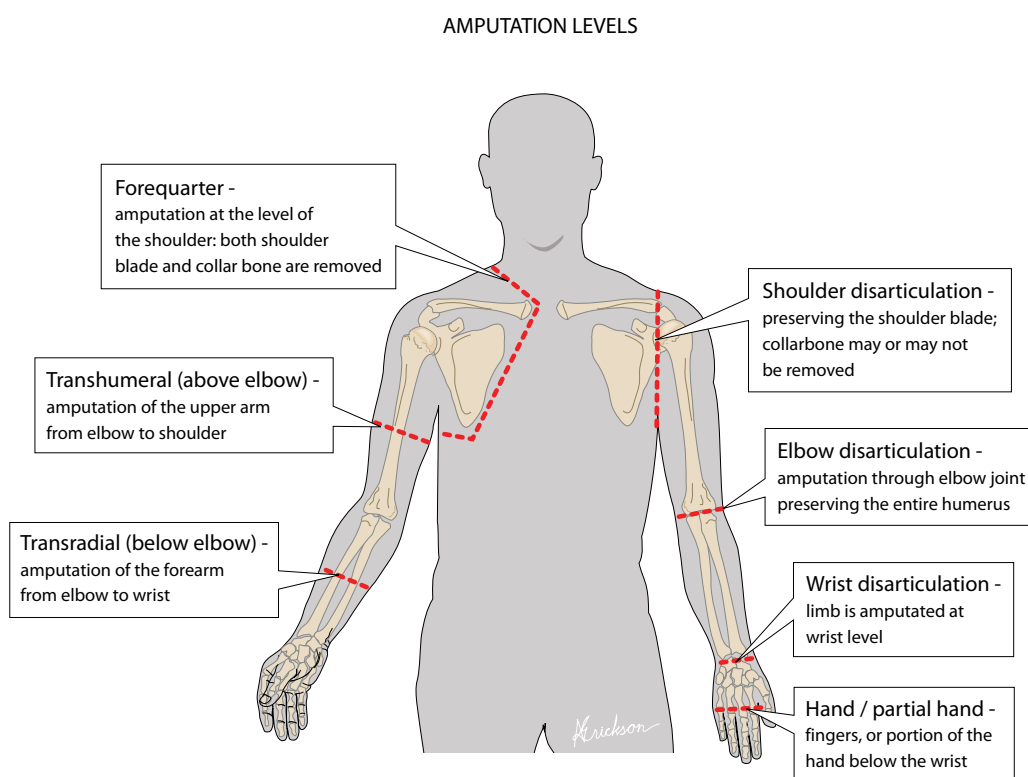
These phases are not defined by fixed points in time. They often overlap based on your needs, injury severity, wound healing, pain tolerance, and psychological readiness. Additionally, progression through the phases of care does not necessarily occur sequentially. Phases are repeated as appropriate based on your needs.



## 1.3 Level of Upper Limb Amputations

The word "**amputation**" is used to describe the removal of all or part of a limb. There are many factors that determine how much of the limb is amputated. Generally, the longer the residual limb and the more joints that are kept intact, the easier it is to be fit with and use a prosthesis.

The major categories of upper-limb amputations are:



The part of the arm that remains after the amputation is called the “residual limb.” It is also often called the “stump.” If you have a preference for the name, let your therapist know.

## 1.4 The Perioperative Phase

### 1.4.1 What Will Happen to Me after the Surgery?

The initial phase of rehabilitation begins with an evaluation of your medical, functional and psychological condition. In the majority of cases, the upper limb amputation is a result of a traumatic injury. If this is your case, you may have woken up in the hospital after the surgery and found an amputation was necessary. In other cases, you will meet the Healthcare Team before surgery and have time to mentally and physically prepare for the operation. You will likely be part of the decision-making process, along with your surgeons, doctors, prosthetists, and therapists. In either case, the goal is to restore your limb to a functional level, while maintaining as much limb length as possible.

### 1.4.2 Initial Evaluation

During the initial evaluation you will learn about your amputation and what to expect afterwards. You will meet and talk with several members of your Healthcare Team: surgeon, rehabilitation doctor, physical and occupational therapists and your prosthetist. They will talk with you about benefits and limitations for your level of amputation (how much of your arm was amputated /or may need to be). They may also discuss the dressing that will be used on the surgical site, surgical site management, as well as pain and sleep.

The main concern during recovery is the healing of the surgical incision and preventing any complications (such as stiffening of the joints and infections). You will learn how to care for your residual limb in order to help with the healing process, and how to manage the pain associated with amputation.

The Healthcare Team will teach you how to move around in bed and perform simple exercises that can prevent stiffening or loss of motion in your joint. They will teach you how to perform everyday activities that you did before your amputation, such as eating, dressing, bathing, and toileting. The team will also assess your needs before you are discharged from the hospital.

The end of the perioperative phase occurs when the residual limb incision is closed, free of infection, closed, sutures removed, and you have been medically cleared for pre-prosthetic training. In this time, you will have worked to maximize your independence in self-care and daily activities using adaptive equipment as needed and alternate strategies. This phase typically lasts from about five to 14 days. You will likely stay in the hospital during this time.

There is a lot to learn in this phase and your entire team is here to help. They will talk to you about your goals as well as what the team would like to accomplish. You will begin the coping and adjustment process from the very beginning, one step at a time.

Knowledge about what will happen to you is very important. Ask questions and make sure all your questions are answered so you will be as prepared as possible for the next phase. Your Healthcare Team is here to help you and your family through this process.

### **1.4.3 Coping with Your Loss**

During your injury or illness and throughout your rehabilitation process, you may experience depression, anxiety, flashbacks, resentment, anger, rage, fear, helplessness, hopelessness, and the loss of body integrity. These feelings are all normal. For example, anger, depression or anxiety, and a mourning period are a normal part of mentally processing an amputation. If you find that these feelings or emotions persist or you find yourself returning to these feelings repeatedly, there are a variety of supports available to help you. Your mental health is very important to your quality of life and your amputation rehabilitation process. There is a variety of support available to help you. In addition to peer support, there are mental health professionals available who can offer medication as well as psychotherapy treatment.

Some individuals describe the loss of a body part as similar to the loss of a loved one. Though a period of mourning for the loss of your limb is considered normal, if you find that your grief continues for more than a few months, it may be helpful to seek support from a mental health professional.

Some individuals find it useful to see a mental health professional from the beginning and then follow up throughout the rehabilitation process as needed.

You can find more information and suggestions on how to cope with these emotions in Chapter 2 “Coping with Amputation.”

### 1.4.4 Discharge From Acute Care

Once your medical condition is stable, the Healthcare Team will make arrangements for your discharge from the hospital and preparation for the next step in your rehabilitation journey. Rehabilitation following amputation can occur in a variety of settings, regardless of whether or not you have a prosthesis. Some individuals will progress directly to an outpatient environment, some may need an inpatient rehabilitation setting, and others may be best served in an intermediate or long-term care facility.

### 1.4.5 Establish Your Goals

Determining your personal goals is very important to the rehabilitation process. Together with the Healthcare Team you and your family will discuss and establish goals. These goals will help you and the Healthcare Team measure your progress and guide your treatment plans.

### 1.4.6 Take Care of Your Health

Your overall health condition can affect your ability to heal properly.

#### TO DO

- ☐ Improve your nutrition.
- ☐ Avoid smoking.
- ☐ Avoid drinking alcohol.
- ☐ Take care of any chronic health condition (e.g. diabetes) and follow recommendations of your Healthcare Team.
- ☐ Take prescription medication as instructed.
- ☐ Be active, exercise, and maintain your fitness.



## 1.5 The Pre-prosthetic Phase

### 1.5.1 What Will Happen to Me?

The goal of the pre-prosthetic phase is to prepare your residual limb for wear of a prosthesis. During this phase you will continue to work toward your goals. You and your Healthcare Team will focus on the things that need to happen before you can be considered for a prosthesis:

- Heal the surgical wound
- Strengthen your muscles and improve range of motion
- Improve your cardiovascular conditioning (fitness)
- Training to improve functional activities

You will work closely with your Healthcare Team learning the necessary techniques to control swelling (edema) and shaping of your residual limb.

In this phase, you may face new challenges to adjust to, and encounter new types of pain or other sensations in your residual limb. Your Healthcare Team will help you work through these problems to maximize your recovery and function.

As your strength improves, your physical rehabilitation program will progress to include total body conditioning and improving your cardiovascular conditioning. You will also learn to improve your daily activity skills. The pre-prosthetic phase ends with the fitting of a preparatory (temporary) prosthesis.

### 1.5.2 Care of the Other Arm

Preserving the function of the non-amputated limb is critical. You will depend on your non-amputated limb to do most of your daily activities that you used to do with both arms. Keeping your non-amputated limb in good condition is very important and will benefit you for a lifetime.

If your amputation was from a traumatic injury, like a blast, your non-amputated limb may have also had an injury. These injuries may impair the function of the non-amputated limb, joints, muscles and nerves. This puts the non-amputated limb at greater risk for overuse injuries and arthritis. It is important that you develop awareness of your body symmetry—upper limb and upper body posture—to prevent overuse injuries in your non-amputated limb. Your Healthcare Team will encourage you to use good body mechanics during activities to reduce overuse injuries.

### 1.5.3 Readjusting and Expanding Your Goals

Rehabilitation is the process of helping you accomplish your goals and needs. It is important that you periodically ask yourself what these are. Expect changes. Share these changes with your Healthcare Team. You may require specialized training and exercise program modifications to meet these goals.

Many individuals with amputations have accomplished goals that are far beyond what many people without amputations have accomplished. Your potential is only limited by your imagination. Be willing to test yourself and to



fail. You will never know what your true limitations are without challenging the ones you face now.

### **1.5.4 Coping with Functional Limitation**

While you are looking forward to leaving the hospital, being back at home can be very challenging. When you are in the hospital, the busy environment, demanding schedule and hospital routines may take up a lot of your attention and focus. There may not be a lot of time to think about how your life will be different after the amputation. Once you settle back into your home, there will be many reminders of how life used to be. It is very important to have support during this time, and to begin the work of figuring out how to again participate in activities and roles that are important to you such as exercising, parenting, taking care of your home, etc.

This is a time when you may also begin to worry about practical matters such as: how your job will be impacted by the amputation, how you will support yourself and your family, and what benefits you are eligible for.

Outside of the hospital, you will face reactions from the community. People will naturally be curious, and some may react in ways that make you feel uncomfortable. This is a common experience for those who are physically different in any way. This is a time for you to seek support from people close to you, and to be in touch with other amputees. Talking with other people who have gone through an amputation can help you recognize that you are not alone, and can give you a place to share stories about your experience.

## **1.6 The Prosthetic Training Phase**

### **1.6.1 What Will Happen to Me?**

The pre-prosthetic phase ends with the fitting of a preparatory (temporary) prosthesis. The prosthetic training phase starts when you get your definitive prosthesis. Should you desire to use a prosthesis, this phase marks a turning point in your rehabilitation. It involves continued conditioning, functional prosthetic training, further adaptation to work and/or leisure activities, and continued psychological support.

You and your Healthcare Team will work together to determine whether you will be able to use a prosthesis or whether you will use other equipment to return to your usual activities.

If you wish to pursue, and are able to use a prosthesis, a preparatory prosthesis will be made to meet your needs. Different prostheses should be considered to assist you in meeting your functional goals. New goals may require changes to the design of the prosthesis, consideration of a different terminal device or necessitate the prescription of a completely new prosthesis.

If you have a single amputation and are not planning to use a prosthesis, you may rely much more heavily on your other (intact) limb. This reliance on the intact limb may lead to overuse, strain, and shoulder and back pain on the intact side. Other problems like tendinitis, bursitis, and aggravation of arthritic conditions could also occur. You can minimize your risk for some of these issues by using a prosthesis.

### 1.6.2 Prosthetic Training

Using your preparatory prosthesis, your therapy will focus on prosthetic education. You and your family will learn the proper terminology related to the prosthesis and its parts, how the prosthesis works and the functional and mechanical limitations of the prosthesis and more. You will then progress to more advanced exercises designed to return you to the highest functional level that your injury will allow.



Whether you do or do not use a prosthesis, your Healthcare Team will work with you to make sure you have all the necessary equipment to meet your rehabilitation goals at home and in the community.

Much of the information you have already learned in the pre-prosthetic phase about

care of your residual limb, pain control, conditioning your body, and how to cope with difficulties will be reviewed and reinforced during this phase.

You can do anything you set your mind to, even though it may look different than it did before the amputation. Where there is a will, there is a way.

## 1.7 Lifelong Care Phase

The final phase of upper extremity amputation rehabilitation is Lifelong Care. This phase typically begins once your definitive prosthesis has been fit or you determine that a prosthesis is not for you and your rehabilitation training is complete.

The goal of the Lifelong Care phase is to ensure you continue to maintain your health and independence. You need to continue to care for your residual limb, your prosthesis, and any other equipment you have been



provided. Your Healthcare Team should provide any necessary rehabilitation services, keep you informed about emerging technologies in upper limb amputation rehabilitation, address any changes in goals or health status, and minimize any consequences of long-term prosthetic use. It is ok to do your own research and to ask questions at any time to make sure you are getting what you need to meet your goals.

You are likely to set new goals and continue to find new activities and interests in your life. Over time, you may find that you are facing new challenges associated with aging such as pain or arthritis. These may be helped with exercise programs designed to keep your muscles strong and joints moving. Your Healthcare Team will help you as you continue to move forward. Be sure to discuss any concerns you have with your team.

You should continue to see your Healthcare Team. They can help you as you progress with your continued recovery and as you encounter new life changes. Visits will be more frequent at first, because there will be changes to your residual limb for 12 to 18 months and you will still be adjusting to your amputation.

You are encouraged to participate in a follow-up assessment at least every 12 months. You should also contact your Healthcare Team anytime that you have questions or new issues arise. Routine follow-up with your Healthcare Team is also important because there may be new developments in technology or rehabilitation techniques, which may benefit you in the future.

## 1.8 Getting Help Throughout the Process

Amputation is an enormous loss and learning to adjust is a process that takes time. It is important to keep in mind that you have an entire team of specialists focused on you to help you regardless of whether it is physical, emotional, psychological, or spiritual. Your rehabilitation is a journey that starts now and follows you throughout your lifetime. Your Healthcare Team will be with you to help you achieve your dreams and goals. The relationship you have with your team is important and highly personal. Seek out those professionals that you feel comfortable with.

### 1.8.1 The Members of the Healthcare Team

The Healthcare Team members keep you, the patient, at the center of the plan and work together with you and your family/ significant other throughout your rehabilitation journey. Healthcare Team members include:

- **You** – Your active participation is encouraged and necessary for your healing. You should feel free to tell your team about your goals and concerns.



The team strives to pay attention to your needs and to involve you in decision-making.

- **Surgeons** – take care of the amputation site and healing of the wound. They also provide surgical revisions if needed.
- **Physiatrists or Rehabilitation Medicine Physicians** – specialize in the comprehensive management of patients with impairments and disabilities arising from neuromuscular, musculoskeletal, and vascular disorders. They prescribe your medications and tests, and consult with your surgeons and other doctors as necessary to prescribe your prosthesis or other equipment you need for the home. The physiatrist guides your overall rehabilitation process in collaboration with the whole Healthcare Team.
- **Nurses** – will care for you from your arrival until your discharge from the hospital. They will monitor wounds for infection, provide pre-operative and post-operative care, monitor pain medication and assist in the activities of daily living.
- **Occupational Therapists (OT)** – provide you with support to enhance performance of daily life activities as well as quality of life. The OTs will help you identify your functional goals, which can include self-care, home management, work tasks, and leisure activities, and offer modifications to complete these goals, if required. The OTs will help you with new ways to do daily activities such as dressing, bathing, using the toilet, eating, and cooking. The therapists will also order equipment you may need.
- **Physical Therapists (PT)** – help you with strength, endurance, transfers, and walking. PTs can also help with pain in your residual limb. They will create an exercise program to help you prepare for a prosthesis and/or return to previous activities, and help you care for your residual limb.
- **Prosthetists** – monitor your healing process, provide you with limb shaping devices such as shrinkers, will measure your limb, take a cast and create a well-fitting socket as the basis of your new prosthesis/artificial limb. The prosthetist will provide information and work with you to design and fabricate the most appropriate device for your unique situation. Often your relationship with your prosthetist will last your lifetime as your needs change, technology advances, and subsequent limbs are necessary.

## 1.8.2 Other Members of the Healthcare Team

- **Family and Care Givers** – are important and their participation is welcomed. They can be trained to assist you in your successful transition home.
- **Mental and Behavioral Health Specialists** – provide emotional and psychological support as you learn to cope and adapt to limb loss.
- **Pain Specialists** – help you manage pain, including residual and phantom which you may experience after limb loss.
- **Peer Visitors** – are individuals like you with a similar medical condition such as amputation who may visit with you and provide, support, share information they have acquired during their rehabilitation and experiences in living with limb loss.
- **Primary Care Providers** – are healthcare practitioners who see people that have common medical problems. This person is often a doctor. However, it could also be a physician assistant or a nurse practitioner.
- **Social Workers/Case Managers** – connect you with VA and community resources for financial, housing, job re-training, and transportation assistance; planning for hospital discharge, and counseling for coping with chronic illness and life changing events.
- **Vocational Rehabilitation Coordinators** – help you to return to your employment if able or if not, can assist you in job retraining and employment.
- **Recreation Therapists** – provide instruction in returning to leisure activities. They also organize community outings and often have lists of local organizations that you may be interested in.
- **Driver Rehabilitation Specialists** – provide instruction and modifications that may allow you to return to driving a car.

Now the journey begins! What seems to be overwhelming now will in time become your new reality. Over the first year, after your upper limb amputation, you will learn a great deal about adjustment to life as an amputee and a prosthesis user (or not). You will discover new ways to approach both simple and complicated tasks. And, most importantly, you will have a team of supportive people, professionals, family, and friends that will continue to help you set and reach your rehabilitation goals. Together, you will develop a comprehensive rehabilitation program that will address your needs, abilities, and emotional well-being that will assist you in reaching your highest level of function.



A photograph of a man with a shaved head, wearing a light green t-shirt, holding a prosthetic arm. The prosthetic arm is white and black, with a curved metal hook at the end. He is looking down at the device with a serious expression. The background is a plain, light-colored wall.

# 2 Coping with Amputation

## 2.1 Recognizing Your Emotions After Amputation

Losing a body part will naturally trigger a variety of emotions. These may include shock, denial, loneliness, sadness, depression, irritability, embarrassment, anxiety, frustration, or anger. Some people may feel relieved that a painful or dysfunctional limb was finally amputated.

There is no right or wrong way to feel after an amputation. This is a very personal experience. Emotional recovery, like physical recovery, will be on your own timetable. Your process is your own, and will vary based on age, sex, the circumstances of your limb loss, available support from your family or friends, coping strategies, and your individuality. For some, faith may play an important role in recovery. Others may take it as another one of life's challenges and work to meet the challenge in the best way they can.

## 2.1.1 How You See Yourself

The loss of a limb is likely one of the most significant challenges that you will ever encounter. Losing a limb is different from any other illness or medical condition because it is a highly visible physical loss and represents changes in function.

There is a risk you may develop issues with body image (how you see yourself) after amputation because the look, symmetry and shape of your body changes significantly. You may feel sad or shocked when you see yourself in the mirror without clothing. If you have a prosthesis, you will need to adapt to seeing your body both with and without the prosthesis. Changes in your body image may affect your self-image, confidence, and feelings about your physical attraction and intimate relationships. Additionally, your family, friends, acquaintances, and members of the general public may have reactions to the way your body now looks. How you react to yourself may also impact how others react to and treat you.

The loss you experienced is not only the physical loss of a body part but, also the loss of your former appearance, level of functioning, athletic ability, and hobbies. You may grieve more for the loss of these functions than for the loss of your limb. Everyone has their own unique reaction. Some people are more concerned about maintaining their physical appearance, while others are more concerned about regaining normal function. You may have fears about social and personal relationships, and you may wonder if your peers and family members will accept you with an amputation.

This also applies to employment options and recreational activities.

The members of your Healthcare Team can help you work through your feelings, achieve a new perspective, and determine the best way to respond to others.



### TO DO

- ☐ Understand that you may experience many, if not all, of the feelings described. Talk to your team about how you are feeling.
- ☐ Ask to talk with a peer visitor who has been through this experience. You don't have to face this alone.
- ☐ Challenge yourself to explore the new you and test the limits.

Adapting to an amputation is a process. There are no shortcuts. The phases of adaptation are similar to adapting to the phases of grief. You may experience denial, anger, depression, and eventually acceptance. Time spent in each phase may vary by individual, but most will experience all. You may find yourself going back and forth between phases.

Thousands of amputees have gone on to live happy and successful lives after limb loss. You will also work with your Healthcare Team to find your successful outcome.



## 2.2 Potential Psychosocial Consequences

Aside from the physical and emotional challenges that come with amputation, other challenges will present themselves. There may be a period where you have to redefine your roles in life and reconstruct a new you.

Your role within your family will likely be impacted at least temporarily. You may have to shift from assisting parents,

siblings, or children to being the one who receives assistance from them. Some find it hard to be the one needing help.

Your limb loss may impact your work life and drive you to reconsider your career options. You may desire or need to pursue new education and training.

Limb loss may change or alter previous relationships or how you interact with those around you. Your roles and responsibilities in various social situations may need to be adjusted. For example, can you engage in the same recreational activities with friends as before or do your friends treat you differently now that you are living with limb loss?



### 2.2.1 Other Behavioral Health Conditions

If you lost your limb as the result of a trauma you may also be coping with post-traumatic stress disorder (PTSD) or a traumatic brain injury (TBI). Your Healthcare Team will address these conditions with you. It is important to minimize the potential for or the effect of self-isolation, irritability, anxiety, poor sleep, poor concentration, depression, and headaches, all of which will make adjusting to your limb loss more difficult.

PTSD can occur in anyone who experiences a traumatic event, especially if that event was life threatening. Post-traumatic stress symptoms include nightmares, emotional numbness, or irritated outbursts, which might occur long after the event that caused them. Communicate with friends and family and seek professional help. There are a number of effective treatment options available.

### **2.2.2 Negative Feelings and Depression**

Adaptation to limb loss is deeply personal for each person who experiences it: some may adapt well to their situation while others may have negative feelings that persist. They may even lead to depression and cause you or a loved one to withdraw and become isolated. If you feel depressed, it is important to seek help from a primary care provider, mental health specialist or, if you need immediate support.

Call the Veterans Crisis Line 1-800-273-8255 and press 1, The Veterans Crisis Line has trained counselors available 24 hours a day, seven days a week. You can also send a text message to 838255. If you are a member of the service, you can call Military One Source 1-800-342-9647, [www.militaryonesource.mil](http://www.militaryonesource.mil).

Having a disability can sometimes make you feel incredibly isolated. Help is always available. You are not alone in your recovery.

### **2.2.3 Family and Intimate Relationships**

As an amputee you will likely have concerns regarding relationships and physical intimacy. Concerns about one's sex life are common and natural. Although your amputation may present new challenges, experience has shown us that most couples navigate this area successfully with time. It is important to discuss your feelings about your attractiveness and physical abilities, as well as the feelings or concerns your partner has. Bringing these topics out in the open gives you and your partner permission to explore your feelings. Sometimes it is helpful to seek couples counseling with a therapist who has experience working with amputees. You may consider talking

through specific challenges or techniques with your Occupational Therapist or other trusted provider.

If you were not in a relationship prior to your amputation, you may have doubts about finding a partner in the future. You may have doubts about another's ability to accept you or you may fear rejection. These feelings are natural, although many amputees meet their future partners after limb loss. Before you can offer your best in any relationship, you must learn to accept and be happy with yourself both emotionally and physically.

If you have children they tend to be curious about new things. Talk openly with them, and answer their questions honestly. They may enjoy learning how your prosthesis works. Children are typically resilient and tend to adjust quicker than adults.

Talking about these topics may be difficult with a non-amputee. Consider discussing the issue with a peer visitor. A support group can provide great insight and hope. It may be helpful just to know that almost every amputee experiences these same feelings and doubts and most are able to overcome these challenges with openness, help from others, and humor.

## 2.3 Coping Strategies

The supportive responses of a partner, friends and family can make a big difference in your comfort with your new self, and in improving your functionality. Individual or group counseling, peer visitors, support groups, family, friends, and even a pet can all play a role in learning to cope with your limb loss.

A peer visit from an experienced amputee can be an important part of your support system and recovery. A peer visitor is not a professional counselor, therapist, or advisor. However, they may be able to relate to your situation and offer support as you adjust to life following your amputation. A peer visitor may be able to provide you with a perspective and knowledge that no one else can. Many facilities have trained peer visitor programs. The Amputee Coalition is also a good resource for peer visitor programs and information about amputation.

Each person feels and reacts differently depending on their personality and the circumstances of their amputation. Each phase of recovery has special challenges and requires different coping strategies. Try to remain flexible in your reactions and response to challenges you may face.

The following pages include some suggestions for coping with your experience. It may help to think about these coping strategies in four areas. The four areas overlap and each supports the other:

- Physical
- Emotional
- Mental
- Spiritual

### 2.3.1 Physical Coping Strategies

Being physically fit is more important than ever. Regular exercise will help with your emotions and your overall adjustment. Maintaining overall health will help with a consistently good fit of your prosthesis. Just like your clothes, you can out grow your prosthetic device with a five to ten pound weight loss or gain. Even if you have never worked out before, your Healthcare Team will assist you in designing a fitness program to meet your fitness level, lifestyle, and interests.

#### TO DO

- ☐ Maintain a regular sleep schedule.
- ☐ Get back to doing as many of your usual daily activities as possible.
- ☐ Eat healthy to improve your sense of well-being, healing, prevent illness, and to provide you with energy when you need it.
- ☐ Get involved in physical and recreational activities that do not cause you pain.
- ☐ Practice deep breathing. This will help relax muscles, decrease pain, and relax and focus the mind.
- ☐ Consult with your Healthcare Team before using alcohol or any non-prescription drugs.
- ☐ Take prescription drugs as prescribed. Ask your Healthcare Team if you have questions.
- ☐ Limit alcohol and nicotine, as they impede healing.
- ☐ Follow your Healthcare Team's instructions.

## 2.3.2 Emotional Coping Strategies

It is common to feel anger, frustration, self-criticism, self-doubt, and sadness. Learning to manage these feelings is part of the adaptation process. If you find yourself in a low, sad mood all or most of the day for many days



at a time, you may be experiencing depression. Talk to your Healthcare Team if you think you are depressed.

### TO DO

- ☐ Know that your feelings are common and tend to decrease over time. But for now, get support! Consider joining a support group.
- ☐ Spend plenty of time with supportive family and friends.
- ☐ Consider writing a journal about your feelings.
- ☐ Talk about your limb loss with a close friend, family member or loved one. This allows them to express their feelings and perhaps give you a different perspective. Remember, everyone is adjusting and this gives them the permission to have some of the same feelings you have.
- ☐ Keep your independence.
- ☐ Explore the benefits of spending time in reflection or meditation.
- ☐ Add humor. Laughter helps the healing process.
- ☐ Focus on your capabilities and accomplishments. You have come a long way!

### 2.3.3 Peer Support

Many large hospitals offer peer support for amputees. It is a program where someone who has been an amputee for some time visits you and your family in the hospital. The Amputee Coalition is a great resource for peer visitation. In most cases, another person with an amputation who has experienced a similar situation, had similar questions, and faced similar decisions can best answer the questions you may have and serve as a coach in your recovery. That is the power of peer support.

You will certainly have some questions about you or your loved one's future - about working, raising a family, maintaining relationships, caring for yourself or your loved one, and about doing basic daily living activities. Other questions may be more technical or focused on immediate concerns:

- What will the pain be like
- How long will I be in the hospital
- How does the artificial limb (prosthesis) stay on
- How long before I get a prosthesis



A peer visit from an experienced amputee can be helpful before amputation surgery. A peer can likely answer your questions regarding issues such as pain, mobility, artificial limbs, services you may require after your release from the hospital, and local resources available to help you. A peer visit might also help lessen your feeling of being alone in your situation. Only others who have experienced limb loss can fully understand the amputation and

recovery experience. They can share information, serve as models of success, and offer understanding and support to help new amputees transition to a new life.

Whether your peer contact comes from an individual or a local amputee support group, the benefits can be great.

### 2.3.4 Mental Coping Strategies

The process of healing requires mental work. If you want to live a positive, healthy life as an amputee, start deciding what success means to you in your new life.

#### TO DO

- ☐ Dedicate yourself to work with your Healthcare Team.
- ☐ Assert yourself and communicate clearly. Tell people around you what you need and don't need.
- ☐ Remember, people want to help, but often don't know how. Allow others to help.
- ☐ Go to a behavioral health professional for evaluation and treatment even if you are not certain it is necessary.
- ☐ Avoid making big decisions when you are feeling overwhelmed or sad. (I.e. such as beginning or ending a relationship, buying or selling a house, a car, or a career change).
- ☐ Always look for the positive first. Replace negative self-talk about your body and life with positive thoughts and ideas.
- ☐ Don't be afraid to fail!
- ☐ You might need to ask for modifications to assist in performing your work. You have the right to ask for certain adjustments in your workspace.

## 2.3.5 Spiritual Coping Strategies

Taking care of your spiritual needs is a way of connecting with your inner self. Spirituality provides a deep connection to something bigger than your everyday life. For some amputees spirituality may give meaning to what has happened. Spirituality can be developed through religion, meditation, music, nature, being with other people, and having hopes and dreams.

### TO DO

- ☐ Keep your dreams and create new ways to define success.
- ☐ Make goals and objectives for the future. Start with small steps.
- ☐ Accept support from loved ones while remaining independent. Consider becoming a peer visitor.
- ☐ Make new memories and plans.
- ☐ Consider becoming more involved if your religion or spirituality is important to you. Chaplains and clergy services can be a good source of support, regardless of your religious preference.
- ☐ Remember, you are the same core person even though you have lost a limb.



## 2.4 Coping with the Unknown

Amputation will be very stressful for you as well as your family and friends. There is often a great deal of anxiety about the unknown and what the future holds.

### 2.4.1 Talk with Your Healthcare Team

When dealing with the unknown, information is power. It is difficult to know what to ask about topics you are not familiar with. This is why speaking with a peer visitor prior to surgery may be very helpful, if possible. A peer visit can also give you a more realistic picture and help you to cope with the reality you will face after surgery. Ask your Healthcare Team specific questions about the medical procedures, the surgery, and the period immediately afterwards. Ask about what your prosthetic options are and the time lines for your recovery. This can help you become more knowledgeable and have a better sense of control over your situation. This will also make you feel a part of the team, and you will have a say in what happens to you.

Coping skills are developed through experience. Because every person's life experiences are different, each person has different coping abilities. When you are facing a difficult situation, use what you know works best for you.

#### TO DO

- ☐ Talk with your Healthcare Team about the surgery and what to expect.
- ☐ Talk openly with your Healthcare Team about your desires and needs. This will help them tailor your treatment to meet your needs.
- ☐ Speak with your Healthcare Team about your prosthetic options.
- ☐ Read educational materials that your Healthcare Team recommends.
- ☐ Talk to other people with amputations. There are some questions that your Healthcare Team will not be able to answer. Sharing your experiences with others will help you conquer the obstacles that you are facing..



# 3 Pain Management

Pain is common following amputation. You may experience the following types of pain after amputation, during your recovery, and occasionally throughout your lifetime:

- Post-surgical pain
- Residual limb pain
- Phantom limb sensations
- Phantom limb pain
- Associated musculoskeletal pain
- Ill-fitting prosthesis pain

Depending upon the type and severity of your pain, there are multiple treatment approaches available. Medication is a common option, and you should ask your Healthcare Team about medications to help treat your pain.

There are other treatment options available that do not include medication, and may be very helpful in controlling your pain. Be sure to also discuss these options with your Healthcare Team.

## 3.1 Pain after Amputation

### 3.1.1 Post-Surgical Pain

Immediately after your surgery, you may experience pain at the amputation or revision surgical site. Post-surgical pain is usually localized to the incision site. This type of pain is generally temporary and may be made worse by swelling and movement of the limb. The pain will lessen as your limb heals, and can be managed during the post-operative period with medication. Your Healthcare Team will teach you how to care for the swelling (which may help decrease your post-surgical pain). Remember that using pain medication as prescribed, and not waiting until the pain is unbearable, will speed up post-surgical recovery time.



### 3.1.2 Residual Limb Pain

Sometimes pain remains in your residual limb after healing occurs. This achy, gnawing, or deep pain comes from the bones and muscles that are still healing and typically improves gradually over time. You may also experience this pain after using your limb in a different manner than before your amputation.

### 3.1.3 Phantom Limb Sensations

Most people with an amputation experience phantom limb sensations. These can be described as non-painful feelings in the missing part of your limb. They are very common (affecting more than 90 percent of the amputee population) and the cause is unknown. You may feel tingling, electrical, or itching sensations. Others describe it as if their limb still feels present, and

they have the sensation that they can move or reposition the missing limb. These are normal experiences and often go away over time. Discuss your treatment options with your Healthcare Team.

### **3.1.4 Phantom Limb Pain**

You may also experience phantom limb pain. Phantom limb pain is any pain that you experience in the part of the limb that is missing. You may find it difficult to understand how a person can feel pain in the area of their limb that is missing. The cause of the pain is unknown. Many people report that their phantom pain lessens over time. There is variation in when and how often the pain may occur. Phantom limb pain can be mild or severe, intermittent or continuous. This pain is often described as: aching, throbbing, burning, shooting, and/or electrical. If you experience phantom limb pain, wearing your prosthesis may reduce your pain.

As with all pain, other factors may affect your level of pain. A number of therapies are available that may lessen your pain. Discuss feelings and treatment options with your Healthcare Team.

### **3.1.5 Associated Musculoskeletal Pain**

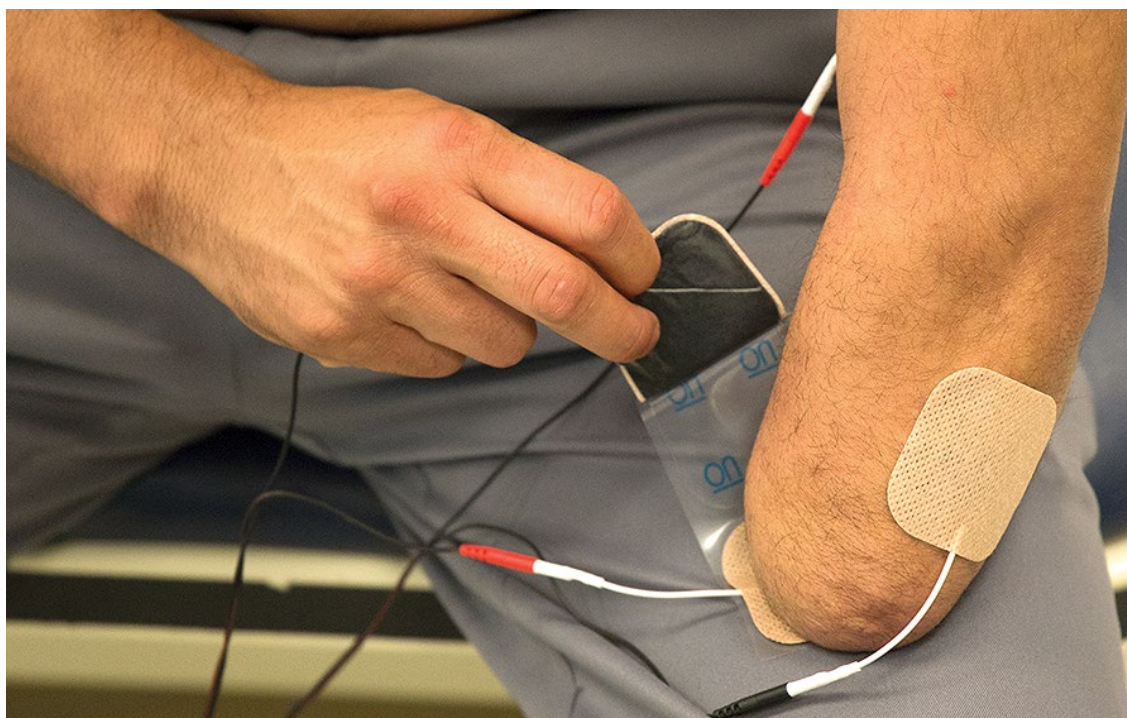
Over many months and years, you may experience pain that occurs in body regions other than the amputated limb. This may occur in areas such as the back, shoulder, or opposite limb. This pain may be related to activities that you do which compensate for the loss of your amputated limb. Staying fit and using proper body mechanics will lessen musculoskeletal pain. Your Healthcare Team can help you with proper body mechanics for safely performing work and leisure activities.

When you initially begin exercising and moving your residual limb, you may feel new pain. This pain may be like the pain you have had after starting a new exercise program. Therefore it is important to have a regular strength training and conditioning program to manage this type of pain or discomfort. This also helps you maintain an ideal weight and lessen the stress on the rest of your muscles, bones, and joints.

### 3.1.6 Ill-fitting Prosthesis Pain

Wearing your prosthesis can sometimes cause pain from rubbing or by applying excess pressure on your residual limb. Your level of discomfort may vary with your overall activity level. Adding limb socks or a change in socket may be required to stop this type of residual limb pain. Or this may be caused by your socket, straps, or harness needing adjustment to achieve a better fit. Your Healthcare Team can help identify the cause of your pain and recommend a means to correct these conditions. Remember, pain in the residual limb may signal a need for an adjustment of your prosthesis.

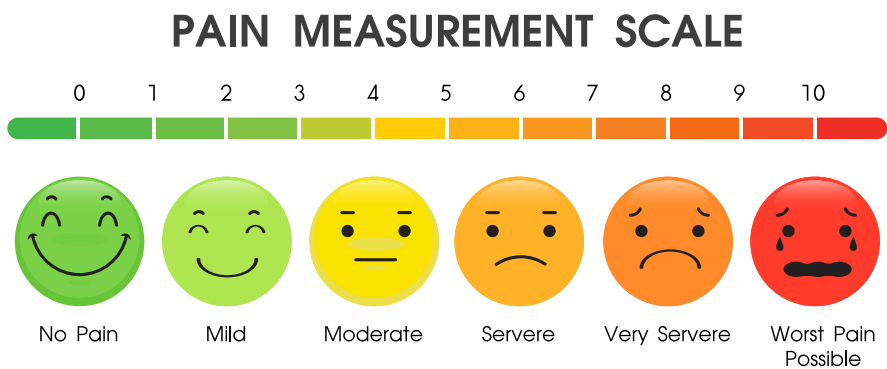
If you have skin breakdown, avoid wearing your prosthesis until the wound heals and you are evaluated by a member of your Healthcare Team. Do not wear your prosthesis until the cause of the pain or skin breakdown is identified and corrected. Taking care of your prosthesis and residual limb will lessen these occurrences.



## 3.2 Pain Assessment

It is important for you to describe your pain as best as you can. Be sure to include in your description where the pain is located in your body, how strong the pain is, and how often it occurs. Also include any activities or positions which make your pain better or worse.

When describing the amount of pain you have, it may be helpful to use a number (between 0 and 10). The number 0 means no pain and 10 means the worst pain you have ever had. Note whether the pain is an aching, throbbing, stabbing, or burning pain. Other factors (fear, stress, sadness) can affect the amount of pain you experience. Take notes about your pain and share this information with your Healthcare Team.



### TO DO

- ☐ Take care of your residual limb. It is critical. If you have pain in your residual limb, don't ignore it!
- ☐ If pain prevents you from participating in your rehabilitation treatment session, take your prescribed pain medication 30 minutes before therapy.
- ☐ Tell your Healthcare Team:
  - about your pain and use the scale from 0 to 10 to rate your pain
  - if your pain is not being adequately controlled
  - about any new pain that occurs or old pain that reoccurs and how the treatment is helping you with your pain

## 3.3 Pain Management

You and your Healthcare Team will develop a pain management program. The plan will be based on the type of pain you have, where the pain is located, and how severe the pain is.

In some cases you may need medication prescribed by your clinician. Always follow the provider's instructions. In addition, you may try to manage your pain with some of the following strategies that do not include taking medication. Talk to your Healthcare Team about all strategies you are using to manage your pain.

### 3.3.1 Non Pharmacological Pain Management

With many of the following techniques, it is important to be guided by a clinician who is trained in these procedures:

- Decreasing swelling (edema): Use elastic bandages, compression stockings, or shrinkers to reduce or control the swelling of the residual limb. This may also help reduce residual limb pain.
- Desensitization: You can lessen the sensitivity of the residual limb by applying other types of sensations to it. Local massage, tapping, and rubbing are examples of desensitization techniques.
- Transcutaneous Electrical Nerve Stimulation (TENS): This provides a low electrical current through pads that are attached to the surface of the skin.
- Massage: This form of pain management is generally safe, easy to perform, and can easily be incorporated into a self-management program.
- Mirror therapy: This is used for single arm loss. Use a mirror to project an image of your missing arm from your intact arm to visualize movement that may potentially reduce phantom limb pain.
- Virtual reality (VR): This therapy uses VR headsets and software designed for visualization of intact limb to perform progressive muscle relaxation techniques for the relief of phantom limb pain. It is similar to mirror therapy.

- Body mechanics and postural re-education: These therapy strategies address pain caused by muscle weakness and overuse.
- Biofeedback: This involves learning how to control muscle tension and tightness in areas of pain.
- Acupuncture: This is thought to provide a balance in energy flow. With acupuncture, tiny needles are placed in specific areas of the body to increase energy flow and create an energy balance. Acupuncture has been shown to drastically reduce the need for pain medication.
- Acupressure: This involves applying firm, yet not too strong, pressure to specific areas of the body without using needles. Like acupuncture, it is believed that pushing on certain pressure points creates a balance in energy flow. You can perform acupressure as a pain-management technique yourself.

You may want to explore other alternative treatments such as hypnosis, Eye Movement Desensitization and Reprocessing (EMDR), use of silver shrinker socks, and magnet therapy with your Healthcare Team. This area of medicine is maturing every day so keep asking questions.



### 3.3.2 Pharmacological Pain Management

There are many different categories of medications that can decrease your pain. Each of them is thought to work on different kinds of pain sensations, and may be used during the different phases of your recovery.

The categories of some of the medications you might be given include:

- Acetaminophen and non-steroidal anti-inflammatory drugs (NSAIDs)
- Opioids (narcotic pain medications)
- Antidepressants
- Anticonvulsants
- Beta-blockers
- Muscle relaxants

Some of these medications work best if taken in combination with other medications and if given at certain times of the day. It is important that you review with your Healthcare Team the potential side-effects of all the medications and nutritional supplements that you are taking such as vitamins, minerals, food and herbal supplements. You and your Healthcare Team need to work together to find the right combination of medications with the fewest side effects to take care of your pain.

#### TO DO

- ☐ Realize that no single treatment is effective for everyone.
- ☐ Understand that your goal is to minimize the impact of pain on your leisure and work activities.
- ☐ Take your medications as prescribed. Watch for and report any possible side effects of the medications you are taking to your Healthcare Team.
- ☐ Be aware of what your body and emotions are telling you. There are many factors that contribute to pain.
- ☐ Seek help from your Healthcare Team in identifying appropriate strategies to care for your symptoms.



## 4 Care of the Residual Limb

The residual limb is the part of your arm that remains after the amputation. Your goal is to develop a stable residual limb. To care for your limb after surgery requires special attention to healing, shaping, hygiene, skin care, desensitization, and plan for lifelong care.

These activities enable you to have a healthy and stable limb, which will give you optimal function, and if you wear a prosthesis, optimal fit. The main focus during initial recovery is the healing of the surgical incision and preventing any complications such as stiffening of the joints or infection. Swelling control and shaping of the residual limb will promote better healing, decrease your pain, and prepare your residual limb for a prosthesis.

## 4.1 Healing of the Incision Site

After the operation, a dressing will be placed over the residual limb to protect the limb and control swelling.

Once the initial dressing is removed, you will see stitches or staples that help to keep the incision intact. These stitches or staples will be removed when your surgical team finds that you have healed sufficiently. Your general health can make a big difference on how fast and well the incision heals. Eating a well-balanced diet, not smoking, and reducing alcohol intake are very important. Also, an incision that is kept clean will avoid infection and heal faster.

### TO DO

To make your incision heal faster you should:

- ☐ Eat a well-balanced diet
- ☐ Drink 6-8 glasses of water per day
- ☐ Don't smoke! If you do smoke, then seek assistance with stopping
- ☐ Limit alcohol intake
- ☐ Make sure that you receive and follow your Healthcare Team's instructions for keeping the incision site clean

Notify your Healthcare Team immediately if:

- ☐ You have increased pain
- ☐ Your incision starts to separate
- ☐ You notice increased drainage of fluid from the incision
- ☐ An odor comes from the incision
- ☐ There is redness, swelling, or warmth around the incision
- ☐ You feel ill or have a fever

## 4.2 Shaping of the Residual Limb

The swelling in your residual limb, also called edema, is the body's normal response to surgery. To control swelling after the operation, a compression dressing is typically placed on the residual limb to keep fluid and inflammation under control and begin the process of shaping. You will wear this compression dressing until your sutures/staples are removed and your wound has mostly healed. You may then progress to a shrinker to complete the process of shaping your residual limb.

### 4.2.1 Wearing an Elastic Shrinker Sock

A shrinker is an elastic sock which is rolled onto your residual limb. Using a shrinker is a way to control your residual limb swelling through constant gentle pressure. Your Healthcare Team will teach you how to use it. It may be easier to use than other options such as an elastic bandage as it does not require being repositioned or rewrapped throughout the day and the amount of pressure is more consistent.

A shrinker is usually worn most of the day, although you will remove the shrinker when bathing or showering or while you are wearing a prosthesis.



It is typically recommended to wear a shrinker for at least 8 hours before seeing your prosthetist for prosthetic evaluation. You may continue to need to use the shrinker to control swelling even after you receive a prosthesis. This is important because a swollen residual limb can make fitting into your prosthesis more difficult, or you may not be able to fit into the prosthesis at all.

**TO  
DO**

- ☐ If your limb becomes painful, cold, or numb from wearing the shrinker, remove the shrinker and consult with your Healthcare Team. You may need a different size.
- ☐ Wear a clean shrinker every day. Follow washing instructions. Have two or more on hand to rotate.
- ☐ If the shrinker has stretched out and is no longer tight, then it's time to contact your team for a new shrinker.
- ☐ The shrinker needs to be pulled up snugly against the end of the residual limb, leaving no wrinkles.

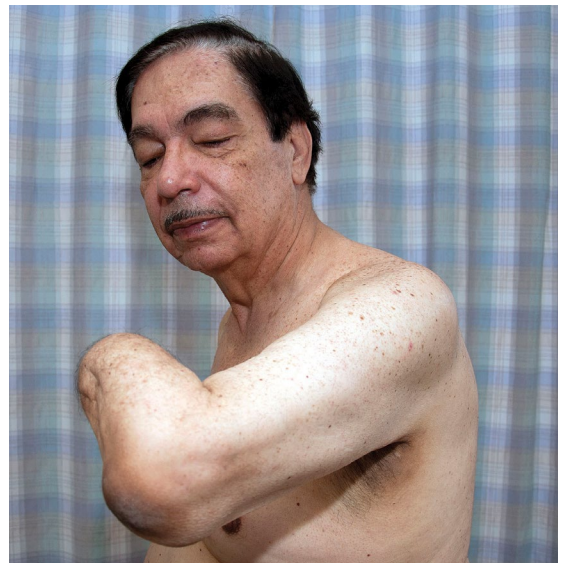
## 4.3 Residual Limb Hygiene

### 4.3.1 Sweating

You may experience an increase in sweating following your amputation. One possible reason is that you have a decreased surface area on your arm. You may be sweating the same amount, but it is concentrated over a smaller body surface. Another possible reason is that while wearing your prosthesis, your residual limb is completely or partially encased in an airtight socket that does not allow sweat to evaporate. If the odor or heavy sweating bothers you, discuss other available treatment options with your Healthcare Team.

### 4.3.2 Inspection of Your Residual Limb

- Examine your skin carefully and frequently for signs of breakdown, infection, rashes, or callusing. If you are diabetic or have poor circulation, you have an increased risk for skin irritation. Ask your Healthcare Team how often to do these inspections initially before you receive your prosthesis.
- Once you have received your prosthetic device, inspect your limb each time you remove your prosthesis and the shrinker. As you become more experienced and accustomed to using a prosthesis, you may find that inspection twice a day is enough to prevent skin problems from developing.
- Inspect all areas of your residual limb. Remember to inspect the back of your residual limb and all skin creases and bony areas. Using a long-handled mirror can help.
- Look for any signs of skin irritation, blisters, or red marks that do not fade within 10 minutes of removing your prosthesis.
- Report any skin problems immediately to a member of your Healthcare Team.



### 4.3.3 Skin Problems

Always consult with your Healthcare Team if you have any abnormal skin condition or areas of specific pain.

Your attention to hygiene and skin care is very important. When you wear a prosthesis, the skin on your residual limb is especially susceptible to irritation, breakdown and infection. The prosthesis can stretch, pull, or irritate your skin. Too much friction, heat, pressure, shear and moisture within the socket combines to bring about damage to the skin.

Skin damage can also result from certain soaps used to clean the residual limb and from the use of certain kinds of creams/lotions inside the socket.

Consult your Healthcare Team immediately if you notice open sores or blisters because they could lead to serious infections. If you have diabetes or circulatory disease and have anything more than a mild rash, consult your provider immediately.

One thing is essential: pay attention to any pain in your residual limb, and if any kind of problem is detected, do not ignore it.

- **Infection** – If your skin feels unusually warm, red, and painful you may have an infection and should contact your Healthcare Team.



- **Blisters or irritation** – Locations where there is excessive friction including the top of the liner or suspension sleeve, are prone to irritation or blistering.
- **Sores or calluses** – Poor or improper socket fit may be related to formation of sores or calluses. Also, if the tissue at the bottom of your limb feels firm and different from the rest of your limb, it may be from a callus.
- **Rashes** – Common causes of rashes are bacteria, fungal infection, or chemicals that are used in the cleansing of socks and liners.

## 4.4 Desensitization

Desensitization is the process of making your residual limb less sensitive. You can desensitize your residual limb with gentle massage, tapping, or vibration. You can also use constant touch pressure, or the input of various textures applied to the sensitive areas of the limb. Desensitization will improve your tolerance to the pressure that will be placed on the residual limb by the prosthetic socket. Perform desensitization when you are not wearing your compression garment (shrinker, elastic wrap, etc.). There are a number of techniques you can use that should be performed several times daily.

### 4.4.1 Rubbing

- Start with a cotton ball and gently rub the skin of your residual limb using a circular motion.
- When you are able to tolerate it, progress to a rougher material such as a paper towel. Then try to advance to a terry cloth towel or shower sponge.

### 4.4.2 Massage

- Massage your entire residual limb using a gentle kneading motion.



If sutures or staples are still in place, do not massage over them. You may massage around them, but be cautious.

- Once your sutures or staples are removed, you can increase the pressure to massage the deeper soft tissues and muscles in your residual limb as well as over your scar line.

### 4.4.3 Tapping

- Tap your residual limb with your fingertips, being careful not to tap with your fingernails.
- It should be done for approximately five minutes three to four times daily. It can be done more often if it helps you to reduce pain.
- Tapping the end of your residual limb may also help improve your tolerance to both touch and pressure.

## 4.5 Lifelong Care of the Residual Limb

In the years and months ahead:

- Take good care of your residual limb and identify any pain, skin breakdown, skin irritation, or formation of new calluses.
- Inspect all areas of your residual limb. Remember to inspect the back of your residual limb and all skin creases and bony areas. Regular inspection of your residual limb, using a mirror if needed, will help you identify skin problems and take action early.
- Report any unusual skin problems or pain to a member of your Healthcare Team.
- Any swelling, weight fluctuations and muscle changes will affect the size of your limb and the fit of your prosthesis. Body changes before, during and after pregnancy can affect fit. Discuss questions, concerns, and the fit of your prosthesis with your healthcare team throughout your pregnancy. If you maintain a proper diet, exercise regularly, and maintain your weight and muscle tone, you can minimize these changes. Continue to work with your Healthcare Team to meet this challenge. You are not alone. There are resources available to assist you.

## **Lifelong Daily Care**

- Every day, or more often if necessary, wash your residual limb with a mild or antibacterial soap and lukewarm water. Rinse thoroughly with clean water to remove all soap.
- Dry your skin by patting it with a towel. Be sure your residual limb is completely dry before putting on your prosthesis. Allow 15 minutes of air-drying before applying your prosthesis. This should ensure that the skin is thoroughly dry.
- Do not use alcohol-based products on your residual limb; they dry out the skin and can contribute to cracking or peeling.
- Avoid prolonged soaking in warm water or hot tubs because this may cause increased swelling in your residual limb.

## **If You Are Wearing A Prosthesis**

- Do not shave your residual limb. Pressure from the prosthetic socket on “stubble” can cause the hair to grow inward, become painful, and, in the worst cases, even become infected. Never use chemical hair removers on your residual limb. If ingrown hairs present a problem for you, consult with your Healthcare Team for treatment options.
- Consult your Healthcare Team before using moisturizing creams or lotions. Vaseline or petroleum-based lotions can damage the prosthetic liners. Only use lotions when your skin is at risk of cracking or peeling. If you need a moisturizer, apply it at night or at other times when you are not wearing your prosthesis. Try to allow eight hours between application and donning your prosthesis. Do not apply lotions to any open wound.
- If needed, applying an antiperspirant to the residual limb can help you control odor and perspiration. Do not apply it to any open wound or irritated skin.



# 5 Physical Rehabilitation

The Healthcare Team will develop an exercise program specifically for you. It will focus on four main components critical to your overall health and function:

- Posture
- Stretching
- Strengthening
- Endurance

Concentrating on these four areas will prepare you for the demands that you will encounter when doing everyday activities. These exercises will help your overall health, protect your joints, and improve your ability to control a prosthesis.

## 5.1 Posture

It is important for you to maintain correct body posture. Incorrect postures may lead to overuse injuries to your upper limbs, neck, or back. You need to be aware of your posture during all your activities. Standing or sitting in front of a mirror provides excellent feedback. Your back should be straight, shoulders level, with your neck and head midline of your body as shown. You should check your posture regularly throughout the day, particularly during activities such as brushing your teeth, combing your hair, and other times where you are able to observe your posture.



Correct posture



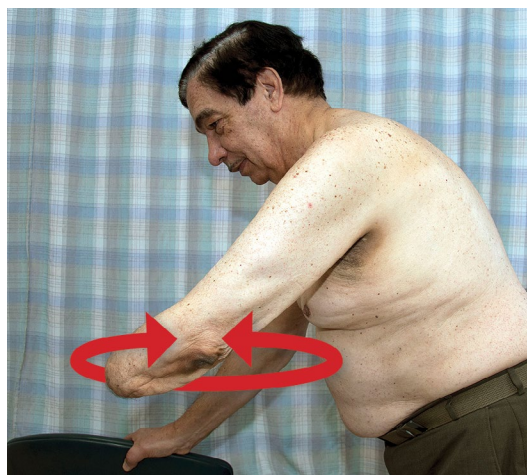
Incorrect posture

Deep relaxation breathing is also helpful to relax tense upper back, shoulder, and neck muscles. If possible, start by placing one hand or residual limb on your upper chest, the other at the notch between your ribs. Close your eyes and take in a deep breath through your nose, feeling your chest and ribs expand. Hold for five seconds and breathe out through your mouth. Repeat three to five times. Perform deep relaxation breathing every two to three hours throughout the day.

## 5.2 Stretching

It is also important to begin moving all the joints of your residual limb. These joint tissues may begin to shorten due to pain, swelling, and lack of use. Tightness that develops may lead to a loss of motion in the joints known as a contracture. Contractures can make it difficult to do daily activities or wear a prosthesis. We want to prevent contractures from occurring. You are encouraged to use your residual limb throughout your daily activities such as eating, bathing, and dressing. In addition to using your arm, you should perform the range of motion and stretching exercises prescribed by your therapist. When performing a stretch, be sure to note a moderate amount of pull that is comfortable enough to hold for 30 seconds,

**Always check with your Healthcare Team before performing any exercises.**



### **Range of Motion and Stretching:**

#### **1. Pendulum/Circumduction**

Bend slightly at your waist and let your residual arm hang freely from your body. Use your body to initiate movement of your limb in a forward and backward motion and also in a circular (clockwise and counterclockwise) motion for 30 seconds each.



## **2. Shoulder Rolls**

Gently shrug shoulders up, slowly roll shoulders backwards pinching shoulder blades together, and slowly lower shoulders keeping shoulder blades together. Repeat as instructed.



## **3. Shoulder Blade Pinches**

With shoulders relaxed, pinch shoulder blades together, holding for 10 seconds. Repeat as instructed.



#### **4. Supine Arm Flexion**

Lie on your back. Grasp the lower end of your residual limb with your opposite hand and lift your residual limb slowly overhead as far as possible. Gently stretch for 30 seconds and repeat as instructed. Motion should occur at the shoulder joint and your shoulder blade should remain still. Keep your back flat. Repeat as instructed.



#### **5. Supine Cross-Chest Stretch:**

Lie on your back. Hold the elbow of your residual limb with your opposite hand. Gently stretch the elbow toward your opposite shoulder. Hold for 30 seconds and return to starting position. Repeat as instructed.



### **6. Standing Chest/Pectoral Stretch:**

Stand in a doorway facing forward. Raise your residual arm to shoulder level and place against the wall or doorframe. Move your body forward producing a stretch across the front of your chest. Hold for 30 seconds. Repeat as instructed.



### **7. Supine Arm(s) Behind Head Stretch:**

Lie on your back. Place your arms (as if hands were clasped) behind your head and slowly lower elbows to floor/bed stretching shoulders outward. Hold for 30 seconds and slowly return to the starting position. Repeat as instructed.



### **8. Side Lying Internal Rotation Stretch:**

Lie on your side with your residual limb positioned at a 90 degree angle to your body at your shoulder. Bend elbow 90 degrees and rotate your residual limb forward to the floor or bed. Apply a gentle stretch with your opposite arm. Hold for 30 seconds and return to starting position. Repeat as instructed.



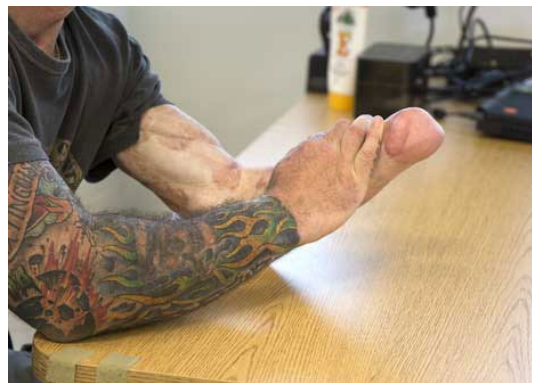
### **9. Standing Internal Rotation:**

Standing or sitting, place your residual limb behind your back. Use your opposite arm to help your residual limb toward your shoulder blade. Hold for 30 seconds. Repeat as instructed.



### **10. Standing External Rotation Stretch:**

Stand in a doorway facing the doorframe. Bend your elbow on your residual limb 90 degrees and place the end of your residual limb against the doorframe. Slowly turn your body away from the doorframe by moving your foot producing an outward rotation at your shoulder. Hold for 30 seconds. Repeat as instructed.



### **11. Sitting Elbow Extension (flexor stretch):**

Place residual limb on table or other supported surface. Straighten your elbow as far as you can. Gently stretch the elbow more by applying slight pressure to the end of your residual limb. Hold for 30 seconds. Repeat as instructed.

## 5.3 Strengthening

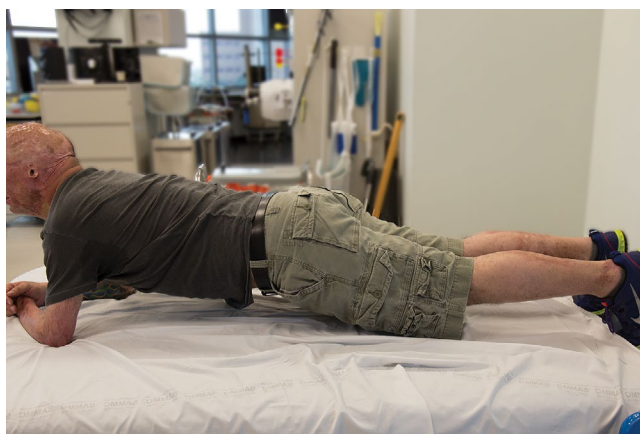
Following amputation, it is common to lose strength. You move less because your residual limb may be swollen and painful and this inactivity causes muscle loss. A loss of muscle strength will make it more difficult to perform daily activities and may cause injury to your joints. Inactivity can also result in loss of bone size and strength which is called osteoporosis. Osteoporosis can lead to fractures of your spine and limbs. Strength training (also known as resistance training) will help prevent loss of muscle and bone. It may also help your self-esteem and body image. It should be a part of your regular daily activities.

You will need to strengthen the muscles in your core (back and stomach), legs, and arms, including your residual limb. After learning from your therapist the proper way to do your strengthening exercises, you can exercise safely at home or in any setting. Resistance bands or weights will increase the load on the muscles and make them stronger. Your therapists can help you with any modifications necessary to strengthen your residual limb.

### 5.3.1 Core Strengthening

The loss of a limb causes a weight imbalance on your body. Therefore, it is important to maintain good posture for a healthy back and neck. Critical to having good posture is a strong core.

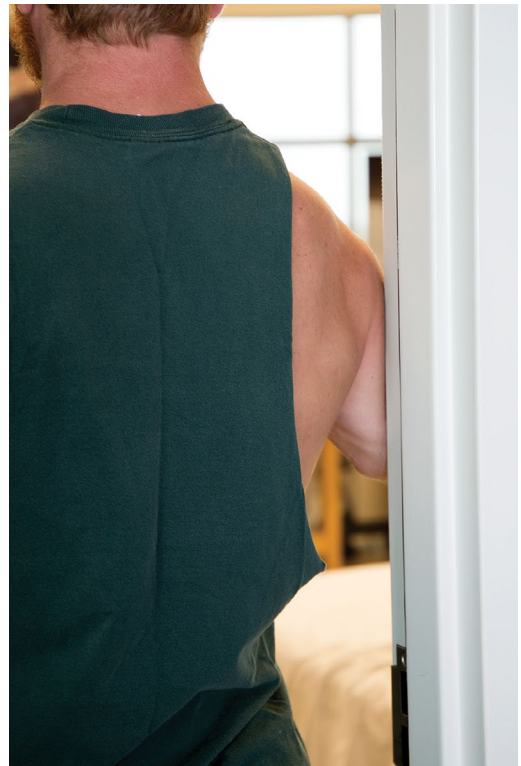
Core strengthening is the appropriate tightening of the muscles (within your trunk) which protect your spine and improve your balance. These exercises give you greater control of your trunk and therefore greater overall stability. This central control reduces excess motion in your arms and trunk that may lead to injury. Core strengthening and stabilization exercises can be combined with other



strengthening exercises of your arms and legs. Examples would be doing the resistance exercises while sitting on an exercise ball or standing on an unstable surface (foam cushion). Performing exercises such as the “plank” allows for weight bearing through the residual limb which helps strengthen the bone as well as your core. Your Healthcare Team will advise you on exercises appropriate for you to perform as well as the number of repetitions.

### 5.3.2 Shoulder Girdle, Upper Back and Limb Strengthening

Muscle strengthening uses a combination of isometric (no motion occurs) or isotonic (muscle moves through a range of motion) contractions. At first, you may perform a general exercise program. As your strength and endurance improves, your therapist will focus on strengthening specific muscles. This is to prepare you for the weight and upper body strength demands of living independently or using a prosthesis. It is important to perform the exercises correctly as they encourage “muscle memory,” making your training with a prosthesis easier.



## 5.4 Endurance

You may find you lack stamina after your amputation. This can be improved by performing endurance or aerobic training. This could include 30 continuous minutes of activity, or several short periods of exercise and activity each day. This is important for your heart and lungs as well as your overall fitness.

Proper nutrition is also extremely important in regaining your stamina. Eating a healthy diet helps to increase energy levels, maintain weight, strong bones, muscles, and skin. Seek assistance from your Healthcare Team who can refer you to a Registered Dietitian (RD) or Registered Dietitian Nutritionist (RDN), if needed.

### 5.4.1 Endurance Training

After amputation, endurance training will help you do activities with less fatigue. If fit for a prosthesis, you will require more energy to do your daily routine. It is important to remain as active as possible to prevent a loss of fitness.

Understanding the benefits of long-term endurance activities and participating in them will help you maintain a healthy body weight and a constant limb volume. Endurance activities can be fun and include any of the following: cycling, walking, jogging, and swimming. Some of the equipment or techniques you use may require adaptation or modification. Your Healthcare Team can assist with these modifications.



## TO DO

- ☐ Check and adjust your posture regularly to ensure you are correctly aligned.
- ☐ Be as active as possible to prevent loss of motion and to improve muscle and bone strength.
- ☐ Perform all exercises as instructed by your therapists.
- ☐ Performing all exercises correctly is more important than the number of repetitions completed.
- ☐ Participate in strength and endurance training as part of your daily routine.





# 6 Functional Rehabilitation

## 6.1 Becoming Independent

An important goal in anyone's rehabilitation is to be able to care for yourself. This means you will be able to accomplish activities including bathing, eating, and dressing by yourself. At first you may require assistance with some activities; however, with the help of your Healthcare Team, time, and practice, you will be able to learn how to perform these tasks independently.

Your Healthcare Team will evaluate your ability to perform daily activities that are important and meaningful to you, apply new strategies and alternate methods, including one-handed techniques, to accomplish these tasks.

With the loss of a dominant hand, you will undergo training to transfer dominant hand skills, such as writing and eating, to your other hand. If you have lost both arms, there are many strategies, assistive devices, and technologies that will allow you to become as independent as possible.

This may be overwhelming in the beginning, but day by day you will challenge yourself to do new activities. Your Healthcare Team will help you along the way.

## 6.2 Activities of Daily Living (ADL)

The first tasks you will begin to learn are how to feed, bathe, and groom yourself. You will also learn how to use the toilet and maintain your personal hygiene. These are some of the Activities of Daily Living, or ADLs: you will learn strategies for one-handed dressing, eating, and other skills. There are a number of useful tools and technologies, sometimes referred to as adaptive devices, to help you in this process. A simple device such as a universal cuff used with an adapted utensil, toothbrush, pen, or pencil may increase your independence.

When a person loses one arm, they can typically learn to do most things one-handed. People with an upper-limb amputation may use a prosthesis part time, or for a specific task that may be difficult with only one hand.

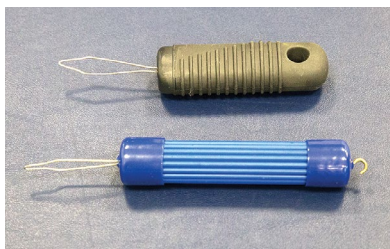
Others choose to wear a prosthesis all day and remove the prosthesis only for sleeping and bathing. You will decide what works best for you.

### 6.2.1 Adaptive Devices

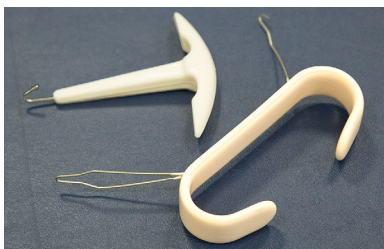
It is important that you learn how to perform ADLs with and without your prosthesis. If for some reason you are not able to wear your prosthesis, you will want to use one-handed techniques, adaptive equipment or other strategies to remain independent. Your Healthcare Team will identify and provide the most appropriate equipment for you.



**Some common and useful adaptive devices include:**



*Button hooks*



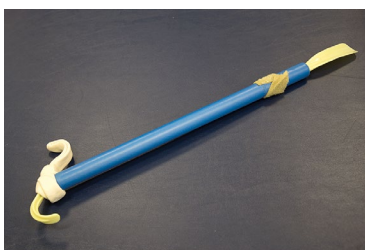
*Zipper pulls*



*One-handed rocker knives*



*Modified long handled sponges and wash mitts*



*Dressing sticks*



*One-handed nail clippers and nailbrushes*



*Cuffs*



*Bottle pumps*



*T-shirts with Velcro closing*



*Grip materials*



*Openers*



*Bluetooth headsets*

## 6.3 Alternative Methods for ADLs

The following pages describe suggestions for performing basic ADL activities including bathing, toileting, personal hygiene, dressing, and eating.

### 6.3.1 Bathing

- Clean the entire body with the non-amputated arm. It is useful to use a washcloth.
- Clean the non-amputated arm by draping the washcloth over the residual limb.
- Wall-mounted sponges or scrub brushes are available to help for those hard to reach areas.



### 6.3.2 Toileting

- You may benefit from the use of a bidet which will help you wash where you cannot reach. Your Healthcare Team can assist you with this decision.
- Using wet flushable wipes may be easier than regular toilet paper.



### 6.3.3 Personal Hygiene

Most hygiene can be managed with one hand, and minor modifications to small or thin items can make them easier to hold with a prosthesis.

- Add a thicker handle to toothbrushes, hair brushes, and bath brushes.
- Use a battery-powered toothbrush. Use “tuning fork” flossing tools.
- Consider an electric water rinsing machine.
- For shaving, consider an electric razor or razor with a flexible head.



### 6.3.4 Getting Dressed

Assistive devices can make dressing easier. These devices may be used with or without your prosthesis. Rethinking clothing choices, such as avoiding clothing with drawstrings, can make getting dressed easier. There are benefits available for clothing modifications. Check with your Healthcare Team if you need modifications.

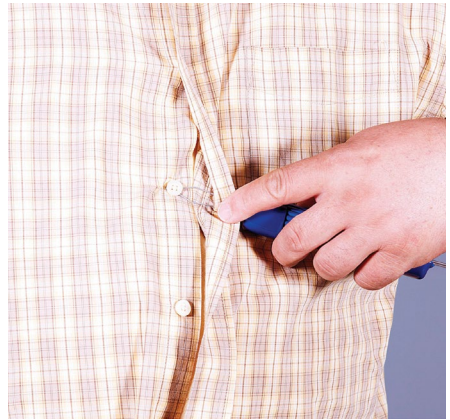
#### Shoes:

- Slip on shoes are the easiest type to wear.
- Elastic shoe laces or Velcro fastenings are alternatives to shoe laces.
- Learn to use a one-handed lacing technique for tying your shoes.



### **Shirts/Dress/Bras:**

- It is easier to use pullover type garments without fasteners, buttons, or zippers. You may find a tank top style or sports bra without fasteners make dressing easier.
- To put on a shirt or dress, place the garment in your lap or on a table. Place your head and/or arms into the shirt. Stand up and let the shirt or dress fall into place.
- A buttonhook can make buttoning your shirt easier.
- To use the buttonhook, place it into the buttonhole, put the wire loop over the button and pull it through the hole.
- You may replace buttons and hooks with Velcro.



### **Pants/Skirts/Underwear:**

- Loops stitched into pants, skirts, and underwear assist with pulling on the garment.
- Rings added to zippers can also make it easier to get dressed.

### **Belts/Ties/Scarves:**

- When putting on a belt, stabilize one end of the belt with your residual limb and use the other arm to tie or buckle the belt.
- Consider clip-on or pre-knotted neckties. Infinity scarves do not require tying.

A dressing tree can be useful to hold clothing or your prosthesis in place at a chosen level when dressing or donning your prosthesis.

### 6.3.5 Eating

- Place anti-slip pad or suction cups on the table beneath your bowl or plate to help prevent them from moving while you are eating.
- A rocker knife or a knife with a round blade makes cutting food easier.
- Sometimes bending the utensil will make it easier to use.
- Utensils can be attached to your residual limb using a universal cuff.



### 6.3.6 Other Daily Activities



You may perform many more complex activities throughout your day. These include preparing meals, housekeeping, yard work, child care, functioning at work, engaging in your community, driving or using other transportation, and enjoying sports and recreational activities.

Your Healthcare Team will teach you strategies to complete these activities with and without your prosthesis, and provide additional needed adaptive equipment. A resource to help you learn to do things one-handed is *“One-Handed in a Two-Handed World”* by Tommye K. Mayer. This book provides strategies for doing things from showering and taking out contact lenses, to painting your house.

Life's demands will require creativity and willingness to try different approaches to perform tasks. Once you and your therapist find an ideal approach, repetition is necessary to improve your skill and speed with any task. From there, learning more complex tasks will often occur with less frustration and more ease. Ultimately, you will choose the method(s) and equipment that work most effectively for you.



## 6.4 Home Assessment and Assistive Technology

An assessment of your home environment may be conducted by an occupational or physical therapist to determine any safety, functional, and accessibility modifications that you may need to return to daily living activities at home. They will also assess your needs for assistive or adaptive technology devices to enhance independence in the home, at work, or to facilitate participation in recreational and leisure activities.

Specialized adaptive equipment or modification of home and work devices may improve accessibility and safety. You may learn to operate phones and computers using your voice. Using voice activation systems, hands free devices, voice recognition software, a track ball, a mini keyboard or one-handed keyboards will improve independence.



*Use of a track ball is often more efficient than using a mouse.*

Many of these items are available through the Computer and Electronics Assistance Program ([www.cap.mil](http://www.cap.mil)) for military beneficiaries or through Prosthetic and Sensory Aids Service ([www.prosthetics.va.gov](http://www.prosthetics.va.gov)) for Veterans. Your Healthcare Team will order any equipment you may need, have it set up in your home, and train you on the devices.

There are several programs available to Service Members and Veterans which provide funds for necessary home modifications. The Home Improvement and Structural Alterations (HISA) grants is one program that provides allowances based upon service connection for modification of kitchen and bathroom facilities as well as access into the home. Examples would be installing a bidet, changing faucets to single controls, or changing door hardware to allow ease of use.

Two additional Department of Veterans Affairs programs provide grants to Service Members and Veterans with certain permanent and total service-connected disabilities to help purchase or construct an adapted home, or modify their existing home. These programs are the Specially Adapted Housing (SAH) grant and the Special Housing Adaptation (SHA) grant. Both have qualifying criteria and should be discussed with your Healthcare Team.

## 6.5 Community Mobility & Driving

Community mobility refers to your ability to move in and around the community using public or private transportation (e.g., walking, riding a bike, driving, or taking a taxi or plane). If needed, you will receive a public transportation assessment. This may include your ability to purchase bus and train fares from kiosks, moving through airport security, or riding a bike.

If you want to drive, you will need to complete a driving assessment with a driver rehabilitation specialist. This driving assessment will include driving in a simulator as well as on-the-road driving. This assessment is for your safety as well as for the safety of others on the road.

The driver rehabilitation specialist will also provide



necessary driver's training and identify any necessary vehicle modifications to ensure your safety. These modifications may include steering wheel and other control modifications. Motorcycle, boating, and other vehicular adaptations are also possible.

## 6.6 Childcare and Parenting

With upper limb loss, the normal tasks of parenting and childcare may need to be adapted to your needs and situation. Because of this, you might identify new goals that you want to accomplish with your prosthesis. This could require making changes to the type of prosthesis you wear or obtaining different componentry for your prosthesis. You may also benefit from the use of new or different adaptive equipment as your parenting and childcare demands change over time. Depending on the level of your amputation, you might find that some tasks are better accomplished without your prosthesis. Make sure to talk with your health care team about your family life and your unique situation and needs. Bring up specific goals with your Health Care Team on how to adapt to tasks such as the ability to transfer objects, how to get up off the floor, and how to pick children up from different surface heights.



Meeting with an Occupational Therapist and a Prosthetist may be beneficial. Prosthetics may need to be modified for safety around children or to complete childcare tasks such as changing a diaper. Your needs will change as your family grows, so stay in touch with your Health Care Team as your needs change.

## 6.7 Social and Leisure Activities

### 6.7.1 Community Integration

Community integration refers to your ability to live, work, and enjoy your leisure time in the community setting. This includes accessing the community environment, and participating in social roles that you want to do such as going to church, volunteering, or playing a sport.

Once you are medically cleared to participate in a community integration program, your Healthcare Team will work with you and with your family to establish social and recreational goals. This process can include exploration of recreational activities, new interests or hobbies, and increasing your awareness of community resources.

It is a great opportunity to try different activities outside the hospital with the support of your Healthcare Team.

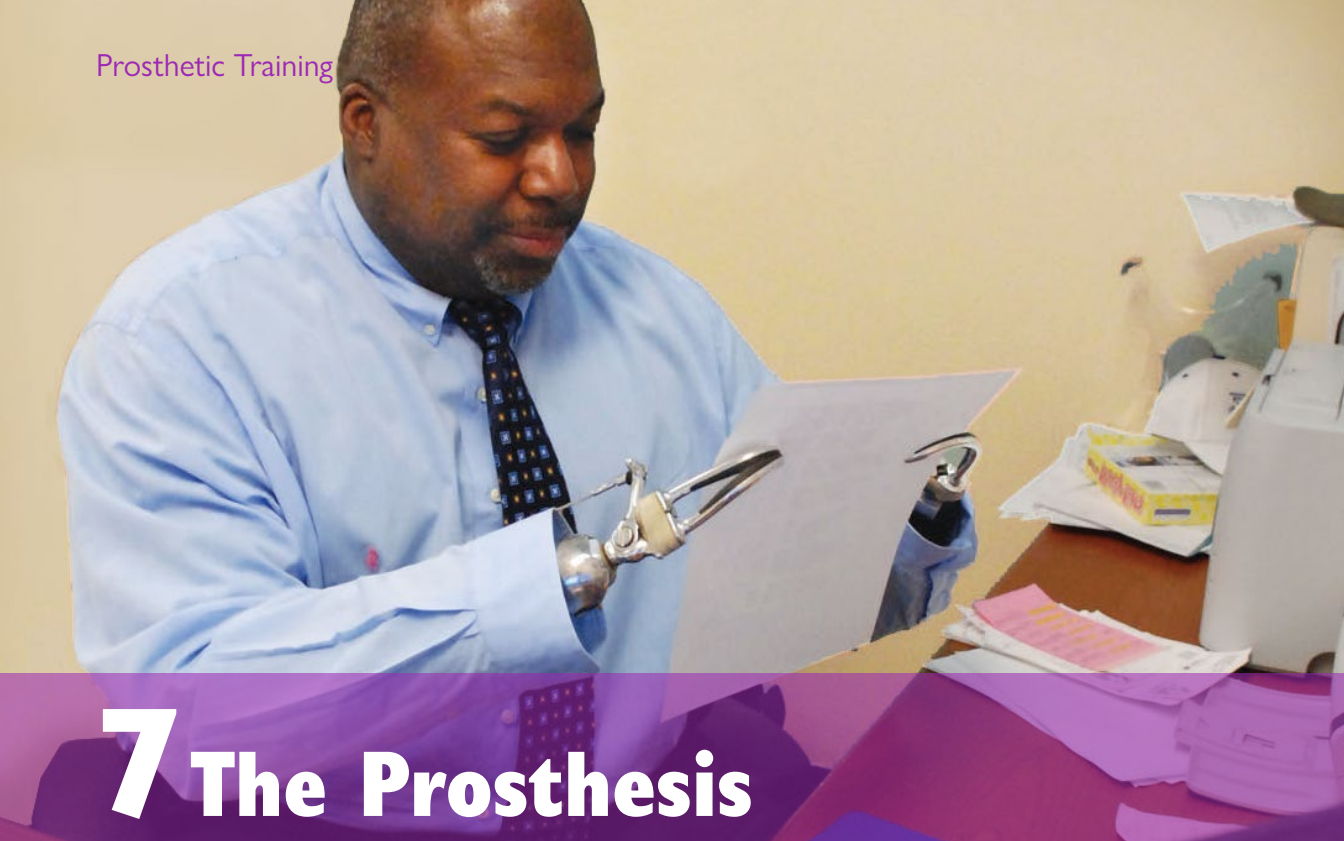




## 6.7.2 Recreational and Sports Activities

Participation in sports and other recreational/leisure activities may have many positive physical and psychological benefits. It may help your self-esteem, keep you active, and provide opportunities to interact with others. There are many terminal devices or adaptations that can be made to sports equipment, making it possible to participate in many different activities that you may have previously enjoyed, such as yoga, knitting, quilting, swimming, golfing, biking, kayaking, fishing, and archery.

There are many organizations that offer recreational activities and adaptive sports clinics to people with amputations. Refer to the resources section in the back of this guide for a listing of those organizations. You may even find that you are able to participate in, and excel, at sports and activities you have never tried before.



# 7 The Prosthesis

## 7.1 Prosthetic Components

There are many different components that make up a prosthetic limb, depending upon the level of your amputation and the type of prosthesis.

Basic components of a prosthesis include:

- a socket
- a suspension system (holds the prosthesis on)
- a wrist unit
- a terminal device (hook, hand, other)

Depending upon the level of your amputation, there are additional components/options for the wrist, elbow and shoulder, to make up the prosthesis.

### 7.1.1 The Prosthetic Socket

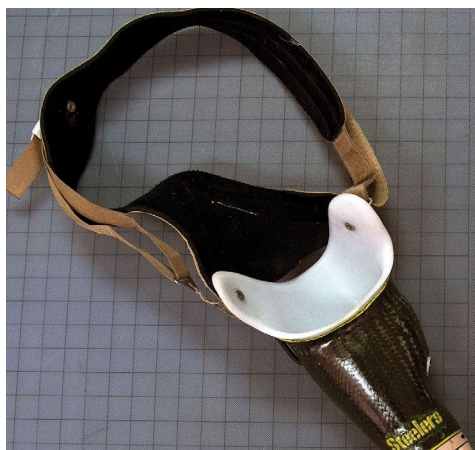
The socket is the basis for the connection between your body and the prosthesis. Your socket is custom made specifically to fit your residual limb. This is important because it must be comfortable or you will have difficulty wearing and using the prosthesis.

To make your socket, your prosthetist will cast your residual limb and create a mold to use in fabricating a custom socket. You may have many prosthetic sockets made over the course of your recovery, rehabilitation, and lifetime.

## 7.1.2 Suspension System

The suspension system refers to how your prosthesis is held onto your residual limb. There are various techniques to provide suspension of a prosthesis:

- **Harness suspension** means that the socket and prosthesis are held in place by a harness around your shoulders. The harness is also used to attach a cable to the terminal device to open or close the hand/hook and may also be used to move the elbow if necessary.
- **Self-suspension** means that the socket is shaped around the bony anatomy of your residual limb to remain in place.
- **Suction suspension** means the prosthesis is held in place by “suction” around your residual limb. This suction is achieved by an airtight, total contact fit between your residual limb and the inside walls of your socket. A valve allows air out of the socket to hold the prosthesis on. Opening the valve allows air into the socket to help take the prosthesis off.
- **Lock and pin suspension** offers a soft interface between you and the socket as well as a mechanical lock. It includes a liner with a pin on the end and a lock in the socket. The liner, made of silicone or other soft material, rolls onto your residual limb. The limb is then inserted into the socket and the pin engages the locking mechanism to hold the prosthesis onto your arm. A release button unlocks the pin when you want to remove the prosthesis.



Regardless of the type of suspension or socket interface of your prosthesis, it must fit well and be comfortable so that you can tolerate wearing and using the prosthesis.

### 7.1.3 Prosthetic Socks

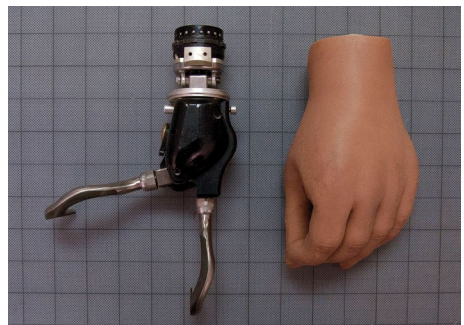
To help with the comfort and fit of your prosthesis, your prosthetist may recommend that you wear a prosthetic sock. Prosthetic socks are available in varying thicknesses, or ply, most commonly 1-ply, 3-ply, 5-ply, and 6-ply. The higher the ply number, the thicker the sock. Socks can be used to accommodate for size changes that will occur in your residual limb over time.



### 7.1.4 Terminal Device

Terminal devices usually come in the form of a hook or a hand. There are also terminal devices designed to perform a specific function or activity. There are advantages and disadvantages to each type of terminal device. A single terminal device may not serve all of your needs. Many times it is possible to interchange different terminal devices on the same prosthesis. For example, you may decide to use a hook to perform heavy labor outdoors, then disconnect it and switch to a natural-looking hand to go out to dinner a few hours later.

- **Hooks** in general, tend to be more rugged, provide a more precise and a finer grip. They allow you to see objects that you are handling which makes manipulation of the object much easier.
- **Prosthetic Hands** are more visually appealing to many people because they can look like an actual hand. Both hooks and hands can be used with body-powered and battery-powered prostheses.



## Other Types of Terminal Devices (TDs)

- **Prehensors** are claw shaped and offer many of the advantages as hooks.



- **Sport Specific or Task Specific TDs** sometimes the device you need for a specific task will require a unique shape. For example there are TDs for playing golf, rowing, weight lifting, fishing, and other activities.



## 7.1.5 Wrists

There are many types of wrist units that offer the user the ability to rotate the terminal device to any position and offer a quick disconnect of the terminal device to easily change between a hook or hand or any other type of terminal device. The external power type of wrist can provide rotation, flexion, and extension of the terminal device at the wrist to better position your prosthetic hand when trying to accomplish a task.



## 7.1.6 Elbows

Mechanical elbows are simple hinges that allow movement of the arm up and down, extend the arm in space and allow the hand or terminal device to bring objects to the mouth or body. Body powered elbows can be bent using a cable connected to a harness, by lifting them with the other arm, or with external power. A locking mechanism can be used to keep the elbow in a certain position while the prosthetic hand is being used to perform a specific task.



*A body-powered elbow*



*A battery-powered elbow*

## 7.1.7 Shoulders

There are shoulder options that assist movement at the joint that allow the arm to be moved and locked in various positions as needed. Additionally, newer technologies, such as motorized shoulders, are emerging and becoming available.

## 7.2 Getting a Prosthesis

It is not currently possible to replace all of the lost functions of any part of the human hand.

However, it is possible to return to doing many activities with the use of a prosthesis.

The Healthcare Team will consider and evaluate several factors to determine the most appropriate prosthesis to meet your needs and your personal goals. This will be based on your level of amputation, the condition of your limb(s), your overall health and fitness and—most importantly—on what you want to achieve.

Generally, there are three options available:

- Use a passive prosthesis
- Use a functional prosthesis
- Use a combination of the above



Many people with an amputation on only one side learn to do most things one-handed, without the use of a prosthesis. There are a range of assistive devices available to make living one-handed easier. You should ask about adaptive equipment to help you achieve your goals.

If you don't have a prosthesis, you may rely much more heavily on your other (intact) limb. This may lead to overuse, strain, and shoulder and back pain on the intact side. Other problems like tendinitis, bursitis, and aggravation of arthritic conditions could also occur. You may minimize the risk for some of these issues by using a prosthesis, even part of the time or for specific tasks.

### 7.2.1 Using a Passive Prosthesis

Passive prostheses are designed to look like a real arm. They are often worn for cosmetic purposes and may help you feel better about your body image after an amputation. You can manually pre-position the fingers on some prosthetic hands to allow you to carry a light bag, push buttons on a keyboard or perform some other basic task.

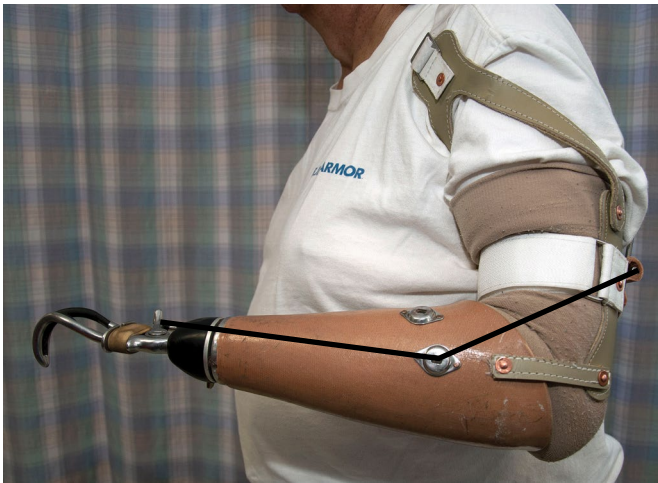
### 7.2.2 Using a Functional Prosthesis

A functional prosthesis is one that you actively control to help you do everyday tasks or specific activities. They feature hands or hooks that you can actively open and close. The most common types of functional prostheses available are called body-powered or externally-powered.

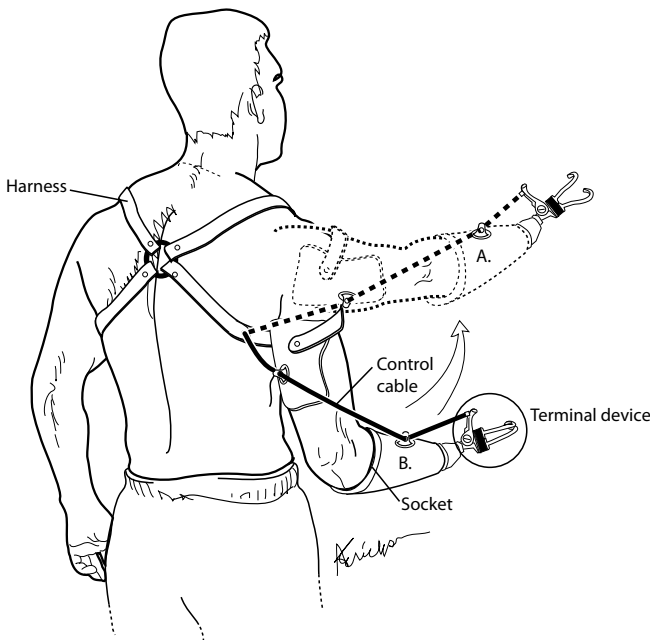


## Body-Powered Prosthesis

A body-powered prosthesis is powered and controlled by body movements of the shoulder, upper arm, or chest. The movements are captured by a harness system worn around your shoulder(s) that is attached to a cable and connected to the terminal device (hook or hand). The movement of your shoulders and residual limb applies tension to the cable that pulls or releases the terminal device.



*A body-powered prosthesis*

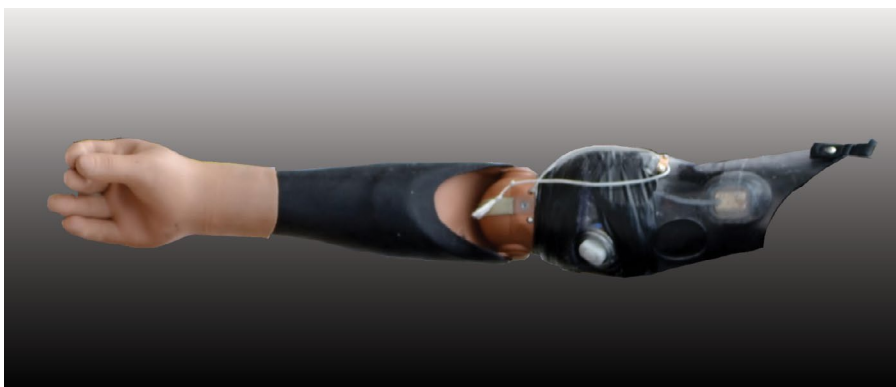


*Operating a body-powered prosthesis, to open a hook, using a harness and cable: raising the arm applies tension on the cable linked to the harness strap which opens the terminal device (the hook)*

## Externally-Powered Prosthesis

An externally-powered prosthesis uses small electrical motors in the terminal device (hand or hook), wrist or elbow. It is often called a myoelectric-controlled prosthesis. The prosthesis includes a battery that powers the motors. The battery can be removed and charged separately or it may have a built in battery that you plug directly into a charger.

The prosthesis is controlled by flexing certain muscles. When you flex your muscle, it gives off an electric signal, which is read by electrodes, built into your prosthesis. The signals you generate power the electric motor that operates the terminal device.



*An externally-powered prosthesis*



*Outer frame of a myoelectric prosthesis and socket*

# Comparing a Body Power and an External Power Prostheses

	ADVANTAGES	DISADVANTAGES
BODY POWER	<ul style="list-style-type: none"><li>• Lighter</li><li>• More durable</li><li>• No battery needed</li></ul>	<ul style="list-style-type: none"><li>• Mechanical appearance</li><li>• Relies on use of other body parts</li></ul>
EXTERNAL POWER	<ul style="list-style-type: none"><li>• No harness needed</li><li>• No cables</li><li>• More realistic looking</li><li>• Strength and body movement not as important</li><li>• Stronger grip force</li></ul>	<ul style="list-style-type: none"><li>• Heavier</li><li>• Dependent on battery life</li><li>• Not water resistant</li><li>• Increased maintenance</li></ul>

## A Hybrid Prosthesis

A hybrid prosthesis is a combination of body-powered and externally-powered prosthetic parts. This is a common option for amputation levels through or above the elbow. Often, the elbow joint on a hybrid prosthesis will be controlled with body-powered components and the wrist and terminal device will be operated with myoelectric components. You and your Healthcare Team will decide upon what type of device is best for you.

## 7.3 Prosthetic Training

### 7.3.1 The Definitive Prosthesis

When your residual limb is healed and has taken a cylindrical shape, you are ready to begin the process of getting your definitive prosthesis. After a comprehensive evaluation and careful consideration of your goals, your Healthcare Team will work with you to decide upon the type of prosthesis that will best meet your particular needs at the time. The definitive prosthesis can be used to try out different prosthetic parts to see what may work best for you. Think of your prosthesis as a tool, with the understanding that different tools are needed for different jobs. Over your lifetime, you will likely be fit with several devices. Some may have different features and/or be useful for specific situations.

### 7.3.2 Fitting the Prosthesis

You will begin the fitting process by meeting with a prosthetist who will take impressions and measurements of your residual limb. These procedures are performed to help make your prosthesis.

The fit of the socket and the alignment of the various parts with respect to each other are very important factors to achieve successful outcomes with your prosthesis. Fitting and alignment are not simple procedures and can take a few days to a few weeks for your prosthetist to accomplish. The complete fabrication of your prosthesis depends upon the complexity of design, components involved, shape of your residual limb, level of your amputation, and the frequency of your appointments with your prosthetist. It will require good communication between you and your prosthetist.

The volume or size of your residual limb will change over time. Good management of possible swelling, such as using a shrinker, will typically reduce limb volume. Sudden increases in volume are typically related to intake of foods with a high salt content. As you work with your prosthetist to create your prosthesis, it is important to maintain a stable body weight, diet modifications, and consistent residual limb shape.

Your prosthetist will begin the process of making your prosthesis by fitting you with a test socket. Prosthetic test sockets are made of clear plastic. They are used to test out the fit of your prosthetic socket before your definitive prosthesis is made.

A properly fit socket is important for several reasons.

A well-fitting socket:

- Will give you the most control of the prosthesis as you use it
- Protects your limb from blisters and abrasions
- Will allow you to move your arm around without the prosthesis falling off

You will want to communicate with your prosthetist how your socket feels on you. Do not be afraid to tell your prosthetist if the test socket is uncomfortable. Most of the time, modifications can be made to improve your comfort and ability to control your prosthesis.

During the first year or two after amputation, you will likely require several sockets. This is because the shape of your residual limb will change as time passes. Your volume will decrease, you may experience muscle atrophy, or you may find you develop some muscle tone in your residual limb. As these changes occur, new sockets will be made to help you maintain the use of your prosthesis.

### **7.3.3 Donning the Prosthesis**

While fitting you for your prosthesis, your prosthetist will demonstrate to you the proper way to put your prosthesis on.

Once a comfortable socket fit is achieved, your goal is to learn how to independently put on (donning), and take off (doffing) the entire prosthesis. You will need to learn what it should feel like when the prosthesis is properly donned. This will help you be more efficient and maximize your function while using your prosthesis.

### 7.3.4 Prosthetic Education

You will learn to name all the components of the prosthesis. Knowing and understanding the parts and how they work is important. You will be able to better explain to members of the Healthcare Team if anything does not fit well or is not providing you with the function you need.

The prosthetist will teach you these important points about your prosthesis:

- The proper terminology related to the prosthesis and its parts.
- What the prosthesis can and can't do
- How you will control and maintain the prosthesis
- Identify any specific precautions for your prosthesis
- How to take care your prosthesis and your residual limb

A good understanding of this information and regular communication with the Healthcare Team will help you become a successful prosthetic user.



## 7.3.5 Proper Use of the Prosthesis

Once your prosthetist completes the fabrication of your initial prosthesis and has gone over the basics with you, they will give it to your occupational or physical therapist.

Your therapist typically will keep your prosthesis between therapy visits until:

- You are given a wearing schedule
- You are taught proper care of the prosthesis
- You are given prosthetic training



### Establishing a Wear Schedule

Once you receive your prosthesis, it will take time to get used to wearing and using it. The muscles, skin, and bones of your residual limb are not accustomed to being used in this way. You will need to develop strength and tolerance to wearing your prosthesis over the first few weeks of having it.

When you begin the training process, your therapist will determine how long you may wear your prosthesis. They will guide you in gradually increasing the wearing time. Your limb will become accustomed to wearing the socket, allowing you to achieve your goals.

### Proper Care of Your Prosthesis

You should clean your prosthesis daily: use a clean hand towel dampened with warm water and soap to wipe the inside of the socket thoroughly, and carefully dry it before you use the prosthesis again. The prosthesis should be dried with a towel or may be air dried. If an odor develops, use rubbing alcohol to clean the inside of the socket. Be aware that if you have a myoelectric prosthesis, it cannot be immersed in water, as it is not water resistant.

In addition to the actual prosthesis, you should also wash the following parts as appropriate:

- Any residual limb socks should be washed daily using mild odorless soap with warm water and allowed to air dry.
- Any liners should also be washed daily with soap and water and rinsed thoroughly to avoid residue build up. Do not use alcohol on liners unless specifically instructed to do so by your prosthetist.
- Cosmetic covers for prosthetic hands can stain easily. Your prosthetist will provide you a glove cleansing cream to clean them.

## TO DO

- ☐ Take the prosthesis to the prosthetist as soon as damage occurs.

## THINGS TO AVOID:

- Using your terminal device as a hammer, wedge, or lever.
- Washing your prosthesis with harsh detergents as this may dissolve lubricating oils in the components.

### **Properly Managing Your Residual Limb**

Caring for your limb is a lifelong responsibility. Your limb shape will change over time and the fit of your prosthesis will change along with it. Stay ahead of potential problems by checking your skin regularly and notifying your Healthcare Team immediately if any of the following should occur:

- Redness that does not fade within 20 minutes of removing your prosthesis
- Rash, blisters, or skin tears
- Pooling of sweat inside your socket or liners
- Development of callouses
- Your socket feels too loose
- Your socket feels uncomfortably tight
- You cannot fit all the way into your socket
- Pain while wearing your prosthesis

At a minimum, be sure to schedule a follow up visit with your Healthcare Team once every 12 months.

If you ignore skin issues, you run the risk of infection or other complications and this may prevent you from being able to use your prosthesis. Most times your prosthetist can make a simple adjustment to your socket to address these issues. Please do not wait to notify your prosthetist as they can address these issues before they become major setbacks.

### **Caution of Overuse Injuries**

It is very easy to develop overuse injuries in your non-amputated limb. Using your prosthesis may reduce the wear and tear on your muscles and joints in your arms and trunk. If you develop pain or discomfort in any of your joints, let your Healthcare Team know immediately. Overuse injuries can often be reduced or even avoided.

## 7.3.6 Controls Training

After you have been fitted with your prosthesis and you have learned how to put it on and care for it, the next step is learning how to successfully and correctly use your prosthesis. This is called controls training.

Controls training will be different for body-powered and myoelectric prosthesis. A body-powered prosthesis uses body movements to control the device and myoelectric devices use muscle contractions to control the device. With practice, you will learn how to best position your prosthesis to make it easy to use and control. You will learn to grasp, hold, and let go of objects with the appropriate amount of force.

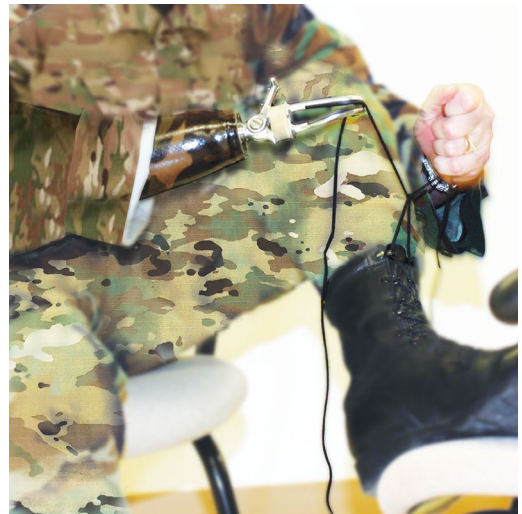
Your therapist will teach you how to “preposition” your prosthesis. Prepositioning involves manually (with your other arm or by pressing against another object) or actively positioning the prosthesis and terminal device before performing a task. As your skills improve, you will be challenged to increase control of your prosthesis in a variety of positions, moving your shoulder and/or your elbow.



## 7.3.7 Activities of Daily Living with a Prosthesis

Working with your Healthcare Team after your initial prosthetic control training is essential. During this stage of rehabilitation, you will learn how to utilize your prosthesis to make tasks of daily living easier. This can include any activity or goal you may have, from handwriting, to driving to child care.

The most successful approach is to tailor the rehabilitation program to your specific needs. It is crucial that you inform your Healthcare Team of any specific interests or goals you have, as these can often be integrated directly into your rehabilitation program. There are many activity-specific terminal devices available today, and these can be prescribed for you to assist in your vocation and/or recreational pursuits.



**Notes:**

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## 8 Resources

The following pages list various associations and resources that are online or in print form. You are encouraged to explore the support tools listed here, or perform your own search for additional resources tailored to your interests and needs. The following information offers a starting point for helping you obtain the information and services that you need. Having an amputation does not mean the end of an active life. Advances in prosthetics and rehabilitation methods enable more and more amputees to pursue many avenues of an active life, including sports.

Please note that over time some internet addresses may change. However, if you search for the name of a particular organization, you should find the current web site.

## 8.1 Resources

- Amputation System of Care: [www.prosthetics.va.gov/PROSTHETICS/asoc](http://www.prosthetics.va.gov/PROSTHETICS/asoc)
- Amputee Coalition: [www.amputee-coalition.org](http://www.amputee-coalition.org) The National Limb Loss Resource Center is the nation's leading source of information about limb loss and limb differences. The Center provides comprehensive information and resources free of charge to people with limb loss and their families, friends and healthcare professionals. Highly recommended. 1-888-267-5669.
- Computer and Electronics Assistance Program: [www.cap.mil](http://www.cap.mil)
- Extremity Trauma and Amputation Center of Excellence (EACE): <http://www.health.mil/About-MHS/Other-MHS-Organizations/Extremity-Trauma-and-Amputation-Center-of-Excellence>
- Home Improvements and Structural Alterations (HISA): <http://www.prosthetics.va.gov/psas/HISA2>
- Military One Source: 800-342-9647, [www.militaryonesource.mil](http://www.militaryonesource.mil)
- Prosthetic and Sensory Aids Service: [www.prosthetics.va.gov](http://www.prosthetics.va.gov)
- Special Housing Adaptation (SHA): <http://benefits.va.gov/HOMELOANS/adaptedhousing>
- VA Caregiver Support Program: [www.caregiver.va.gov](http://www.caregiver.va.gov)

## VA/DoD Adaptive Sports and Recreation Websites

- DoD Adaptive Sports programs: <http://warriorcare.dodlive.mil/carecoordination>
- Military Adaptive Reconditioning Program: contact [osd.masp@mail.mil](mailto:osd.masp@mail.mil)  
<http://wct.army.mil/modules/soldier/s5-adaptiveReconditioning.html>
- Military Adaptive Sports Program (MASP): <https://www.defense.gov/News/Special-Reports/Warrior-Care-Month-2015/Healing-Power-of-Military-Adaptive-Sports-Program>
- VA Adaptive Sports and Recreation Programs: [www.va.gov/adaptivesports](http://www.va.gov/adaptivesports) and @Sports4Vets on social media

## **Community Amputee Sports and Recreation Websites (not officially endorsed by VA/DoD)**

- Adaptive Adventures: 877-679-2770, [www.adaptiveadventures.org](http://www.adaptiveadventures.org)
- Adaptive Sports Association: 970-385-2163, 970-259-0374, [www.asadurango.org](http://www.asadurango.org)
- Adaptive Sports Center: 866-349-2296, [www.adaptivesports.org](http://www.adaptivesports.org)
- Adaptive Sports Foundation: 518-734-5070, [www.adaptivesportsfoundation.org/programs/military-programs](http://www.adaptivesportsfoundation.org/programs/military-programs)
- Adventures Without Limits: 503-359-2568, [www.awloutdoors.com](http://www.awloutdoors.com)
- American Amputee Soccer Association: [www.ampsoccer.org](http://www.ampsoccer.org)
- Amputee Long Drive Championship: <http://www.amputeealongdrivechampionship.com/index.html>
- Challenged Athletes Foundation: 858-793-9293, [www.challengedathletes.org](http://www.challengedathletes.org)
- Disabled Sports USA: 301-217-0960, [www.disabledsportsusa.org](http://www.disabledsportsusa.org)
- Enhancing Skills for Life: [www.enhancingskillsforlife.org](http://www.enhancingskillsforlife.org)
- National Center on Health, Physical Activity and Disability: 800-900-8086, [www.nchpad.org](http://www.nchpad.org)
- National Sports Center for the Disabled: 970-726-1540, [www.nscd.org](http://www.nscd.org)
- Wheelchair Sports USA: 720-412-7979, [www.wasusa.org](http://www.wasusa.org)
- World T.E.A.M Sports: 617-779-0330, [www.worldteamsports.org](http://www.worldteamsports.org)

## 8.2 Glossary

- Abduction: Motion of a limb or body part away from the middle of the body. —adduction is its opposite.
- Acquired Amputation: The surgical removal of a limb(s) due to complications associated with disease or trauma.
- Acupuncture: An ancient Asian mode of therapy used to cure disease or relieve pain; the process employs long, thin needles that are inserted into the body at specific points.
- Adaptive Equipment: Any equipment that helps you with activities of daily living.
- Activities of Daily Living (ADL): Routine activities that people tend to do every day without needing assistance. There are six basic ADLs: eating, bathing, dressing, toileting, transferring (walking) and continence.
- Above-the-elbow (AE): A specific level of amputation—also known as transhumeral.
- Alignment: The socket is attached to the prosthesis at certain angles. These angles need to be adjusted by your prosthetist and are determined by the position and anatomy of your limb, and the characteristics of the artificial wrist and or hand.
- Alternative Therapy: A treatment that is used in place of or in conjunction with traditional medicine (e.g., acupuncture, yoga and electrical stimulation or TENS units).
- Assistive Device: Any equipment that helps you with activities of daily living.
- Atrophy: Diminishing size and strength of muscles.
- Below-the-elbow (BE): A specific level of amputation—also known as transradial.
- Bilateral: Both sides.
- Biofeedback: A form of self-hypnosis.
- Body Image: The awareness and perception of one's own body in relation to both appearance and function.
- Body-Powered Prosthesis (upper extremity): An arm prosthesis powered by movement in the upper extremity portion of the body, specifically the muscles of the shoulder(s), neck and back. The movements generate tension in a cable attached to a harness forcing terminal device (hook or prosthetic hand) to open or close.
- Care Coordinator: A care coordinator coordinates individual care and resources for patients with complex healthcare needs that require coordination of services and providers.

- Check or Test Socket: Clear plastic socket made first to see if the socket fits properly.
- Components: The term used for the different part that make up your prosthesis.
- Contracture: Tightening of muscles and joints, limiting motion around a joint.
- Contralateral Limb: The unaffected or residual, non-amputated limb.
- Definitive or Permanent Prosthesis: The definitive prosthetic replacement for the missing limb or part of a limb.
- Desensitization: Reducing sensitivity of an area of the body by massage or other means
- Disarticulation: An amputation of a limb through a joint, without cutting any bone.
- Distal End: End of stump (residual limb).
- Donning and Doffing: Putting on and taking off a prosthesis.
- Durable Medical Equipment (DME): Assistive devices, such as crutches, walkers or wheelchairs reachers, bidets, adapted utensils that are used by patients at home.
- Edema: Accumulation of excess fluid in body tissues (swelling).
- Flexible Inner Socket: Flexible plastic sometimes used inside the socket, which can sometimes provide additional comfort.
- Gel Liner: Silicone type gel sock that goes next to your skin for protection. There are many types and thicknesses.
- Hard Socket: A socket made of hard materials only.
- Harness: Straps that keep your arm prosthesis on.
- Hybrid Prosthesis: A prosthesis that combines several prosthetic options in a single prosthesis, usually for individuals who have a transhumeral (AE) amputation. The most common hybrid prostheses combine a body-powered elbow and a myoelectrically-controlled terminal device (hook or hand).
- Lateral: The side away from the body.
- Liner (roll-on liner): Suspension systems used to hold the prosthesis to the residual limb and to provide additional comfort and protection for the residual limb. These liners may be made of silicon, pelite, or gel substances.
- Medial: Toward the center of the body.
- Mirror Therapy: Therapy that uses a mirror to project an image of your missing arm from your intact arm to visualize movement that may potentially reduce phantom limb pain.
- Myodesis: During an amputation, stabilization of the divided muscles by directly suturing muscle to the bone.

- Myoelectrics: A technology used mainly in upper extremity prosthetics to control the prosthesis via muscle contraction using electrical signals from the muscles.
- Neuroma: When a nerve is severed during amputation, the nerve endings form a mass which is often painful.
- Occupational Therapist (OT): Professionals who provide rehabilitation through the performance of activities required in daily life which are designed to improve or restore independence.
- Peer Support: A trained amputee talking to another amputee before or after amputation.
- Phantom Limb Pain (PLP): Painful sensations in the part of the limb that has been amputated.
- Phantom Sensation: A feeling that the missing body part is still there. It may involve uncomfortable but not necessarily painful sensations such as burning, tingling and/or itching.
- Physiatrist: Doctor who specializes in rehabilitation.
- Physical Therapist (PT): Professionals who provide rehabilitation that reduces pain and improves or restores mobility through therapeutic exercise, physical modalities, assistive devices and patient education and training.
- Posterior: The back side of the body.
- Preparatory Prosthesis: An unfinished, functional replacement for an amputated limb, fitted to accelerate the rehabilitation process, control edema, and prepare the residual limb for the external forces associated with wearing a prosthesis on a day-to-day basis.
- Proprioception: The awareness of the position of your body.
- Prosthetist: A person who measures, designs, fabricates, fits, or services a prosthesis.
- Prosthesis: An artificial limb.
- Protheses: The plural of prosthesis.
- Prosthetic: Refers to an artificial body part, such as a limb.
- Rehabilitation: The process of restoring a person who has been debilitated by a disease or injury to a normal, functional life.
- Residual Limb (also residuum): Technical term for the part of your limb that is remaining (stump).
- Revision Surgery: Surgery to modify the residual limb.
- Rigid Dressing: A plaster wrap over the residual limb, usually applied immediately following surgery for the purpose of controlling edema and pain.
- Shoulder Disarticulation (SD): An amputation through the shoulder joint.

- Range of Motion (ROM): The amount of movement a limb has in a specific direction.
- Shrinkers: Elastic stockings meant to reduce the swelling or “edema” in your limb to shrink it in preparation for a prosthetic fitting.
- Socket: The part of the prosthesis, which is custom made to fit around and envelopes the residual limb. Prosthetic components are attached to the socket.
- Soft Compression Dressing: Usually elastic bandage materials that are reapplied often to maintain compression and reduce swelling.
- Split Hooks: Terminal devices for upper extremity amputees consisting of two hook-shaped fingers that are operated (opened and closed) through the action of a harness and cable system.
- Stump: The residual limb.
- Socks: Socks that go over your residual limb. These come in different thicknesses (ply). The higher the ply, the thicker the sock—usually 1-2 ply, 3 ply, and 5 ply.
- Suspension: The way the socket stays on your limb.
- Switch Control: A control switch for an electronically-controlled prosthesis (see myoelectrics) that is used to regulate current from the battery to the operator.
- Tapping: A technique to decrease the sensitive feelings in a residual limb.
- Terminal Devices (TDs): Devices attached to the wrist unit of an upper extremity prosthesis that provide some aspect of normal hand function (e.g., grasp, release, etc.).
- Therapeutic Recreation: This mode of rehabilitation provides instruction in returning to leisure activities.
- Traumatic Amputation: An amputation that is the result of an injury.
- Unilateral: An amputation that affects only one side of the body (opposite of bilateral).
- Upper Extremity (UE): Having to do with the upper limbs of the body.
- Virtual Reality (VR): Therapy using VR headsets and software designed for visualization of intact limbs to perform progressive muscle relaxation techniques for the relief of phantom limb pain. It is similar to mirror therapy.
- Voluntary-Closing Devices: Terminal devices that are closed by forces on a control cable; grasp is proportional to the amount of pull on the cable.
- Wrist Disarticulation (WD): An amputation through the wrist joint.

**Notes:**

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For additional information, visit: [www.healthquality.va.gov/guidelines/Rehab/ULA/VADoDULACPG\\_PatientSummary\\_Final\\_508.pdf](http://www.healthquality.va.gov/guidelines/Rehab/ULA/VADoDULACPG_PatientSummary_Final_508.pdf)

Scan the QR Code with your smart device to read the Patient Summary of the 2022 VA/DoD Clinical Practice Guideline for Upper Limb Amputation Rehabilitation.

