

***Rehabilitation after Limb Loss:
A guide on what to expect to
achieve your goals***

*TIRR Memorial Hermann
Houston, Texas, USA*

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*This manual is dedicated to the past, present and future patients of the
TIRR Memorial Hermann Limb Loss Rehabilitation Program.
Their courage inspires us daily.*

This manual is intended to provide a basic understanding of amputee rehabilitation. It is not intended to replace reference texts or physician recommendations. The information in this manual is based on the experiences of the professionals at TIRR Memorial Hermann. The authors, editors, and publisher are not responsible for errors, omissions, or consequences from use of this manual.

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TIRR Memorial Hermann is a not-for-profit hospital in the Texas Medical Center that provides rehabilitation care for those who have experienced catastrophic injuries or illnesses. It has served the community since 1959 and now has several locations throughout the Houston area. Catastrophic injury or illness may include traumatic brain injury or stroke, spinal cord injury, single amputations, multiple amputations, Neurodegenerative Diseases, poly- trauma, and/or other congenital or neurological disorders.

Foreword

The Amputee Program at TIRR/ Memorial Hermann has served individuals with amputations since 1971 and is uniquely experienced in the rehabilitation of persons with multiple limb loss resulting from trauma or disease. TIRR Memorial Hermann has been awarded many research grants that have kept the program at the forefront of amputee technology, thereby benefiting the outcome of all persons referred to the Limb Loss Program.

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REHABILITATION AFTER LIMB LOSS

Welcome to the Amputee Rehabilitation Program at TIRR. Your limb loss may be **congenital** (present at birth) or the result of **trauma** or **disease**. We acknowledge the physical and emotional experiences you have already had as a result of losing a limb and invite you to begin your rehabilitation course at TIRR Memorial Hermann. An interdisciplinary team of health professionals will assist you in moving toward your goals in the appropriate rehabilitation setting. Every person's rehabilitation course is individualized and may consist of one or more of the following phases:

- **ACUTE HOSPITALIZATION**

Pre- and post- planning for the amputation surgery, rehabilitation with therapies after surgery, wound care, education and discharge planning with emphasis on continuation of care, adjustment to life with an amputation and planning for future follow up care.

- **INPATIENT REHABILITATION PROGRAM (PRE-PROSTHETIC TRAINING AND/OR PROSTHETIC TRAINING)**

Intensive 24 hour nursing, medical care and at least 3 hours of therapy in a comprehensive rehabilitation setting.

- **OUTPATIENT CLINIC**

Initial or follow-up appointments with your physician, prosthetist, and/or therapist to address concerns that directly relate to your limb loss or resulting functional problems.

- **OUTPATIENT THERAPY SERVICES**

One (1) to three (3) treatment sessions per week with Physical Therapy (PT) and/or Occupational Therapy (OT) if an intensive inpatient stay is not required or for those who have completed inpatient treatment and are continuing to work toward accomplishment of long term functional goals.



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COPING WITH LIMB LOSS

THE MOST IMPORTANT MESSAGE OF REHABILITATION IS THAT THERE ARE MANY OPTIONS FOR YOU - AND HOPE FOR THE FUTURE.

Losing a limb causes a significant physical and emotional impact in a person's life. Coping with the loss of a limb is a process that begins during your hospitalization and continues even after you have returned home to your daily activities. You and your family may be dealing with a variety of feelings, issues, and concerns that have resulted from your loss. Coping styles and methods differ; what may help one individual/family may not be effective for another. It is important to recognize your concerns and how you best deal with them in order to move forward.

The goal of rehabilitation is for you to regain independence, dignity and self-assurance. The positive feelings that you have about yourself give you a sense of self-esteem, value, and worth. This positive sense of self is largely determined by your capabilities for independent function and direction, having meaningful personal life goals, and the role you play in your family and community. It is natural following limb loss to feel sad about what you have lost and to have concerns about independence, goals, and roles.

INDEPENDENCE

You may worry about losing your independence and control. You may need help with tasks that are viewed as simple to perform such as eating a meal, opening a door, or turning on the television. Someone may need to assist you with activities of personal care, including dressing, bathing, or hygiene. You may feel frustrated because your body no longer performs like it did before, and you may also experience pain or unusual sensations that affect your independence. These feelings and frustrations are normal reactions to the loss of your limb. Recognizing the importance of your role in the rehabilitation process will increase your sense of control over your life and can help to decrease the frustrations associated with the loss of a limb.

PERSONAL GOALS

As a result of your amputation some life goals that you had set for yourself may be disrupted. Some goals may no longer be achievable while others may need to be reassessed and revised. Realizing this may cause feelings of apprehension and grief that are normal responses when faced with changes in your life goals and dreams.

ROLES

You may be faced with many questions about the roles you will play in the future. “Will I be able to support my family?” “Will I be able to return to work or school?” “Will my friends and family see me as the same person?” “Will I ever do the same things I used to do?” Because of your disability you may experience some temporary or permanent changes in these roles.

You will have many opportunities to talk with team members about your feelings concerning the loss of a limb and the implications for your future. By discussing these feelings, you can develop strategies for coping and for dealing with your concerns about changes in independence, life goals, and role functions. Family members may be experiencing many of the same concerns and may also need to discuss how they are dealing with the new demands, expectations, and fears for the future.

“The human mind is an amazing thing- but no one ever wrote an owner’s manual for it. I discovered what occupies your mind is what is most real to you. By concentrating on my abilities, rather than my disabilities, my abilities became the most real in my mind. It sounds almost too simple to be true- but it is.”
(Sabolich, CPO, John. You’re Not Alone. NovaCare Sabolich, 1995)

Post-Traumatic Stress Disorder (PTSD)

What is PTSD?

Post-traumatic stress disorder or PTSD is a psychiatric disorder usually brought about by personally experiencing or witnessing first hand a disturbing, unexpected external event that involves actual or threatened serious injury to one’s own or another person’s physical integrity or even death.

What are the symptoms of PTSD?

In one of 10 Americans, the experience of a traumatic event triggers a series of psychological and biological changes that we have come to know as PTSD. Exposure to a traumatic event activates the fight or flight response with involves increased production to adrenaline, increased blood pressure and heart rate, and increased glucose to muscles that allow us to run away quickly. You re-experience the event or may have distressing dreams and nightmares that play the trauma again and again. You may undergo severe psychological distress when events are replayed in your mind or when you find yourself in circumstances that resemble or symbolize the traumatic event.

Please see your physician if you experience the following symptoms:

- Flashback- the traumatic event gets played in your mind again and again and it feels as if it was occurring in real time, even when you try to avoid thinking about it. The experience is as real as if the event was happening now, even if the original event occurred 50 years before.
- Avoidance- There is a continuous effort to avoid talking about the trauma including avoidance of thoughts, feelings, conversations, people situations and activities that remotely resemble the traumatic event.
- Emotional detachment- If you are unable to form social and/or personal bonds.
- Jumpiness- If you over-react to small things and tend to be hyper-vigilant in any environment, trying to forestall danger that may not exist.

You may want to ask your physician about the following options to help with PTSD: counselling, peer, support groups.

ISSUES AFFECTING THE HEALING PROCESS

NUTRITION: WHY IS DIET IMPORTANT?

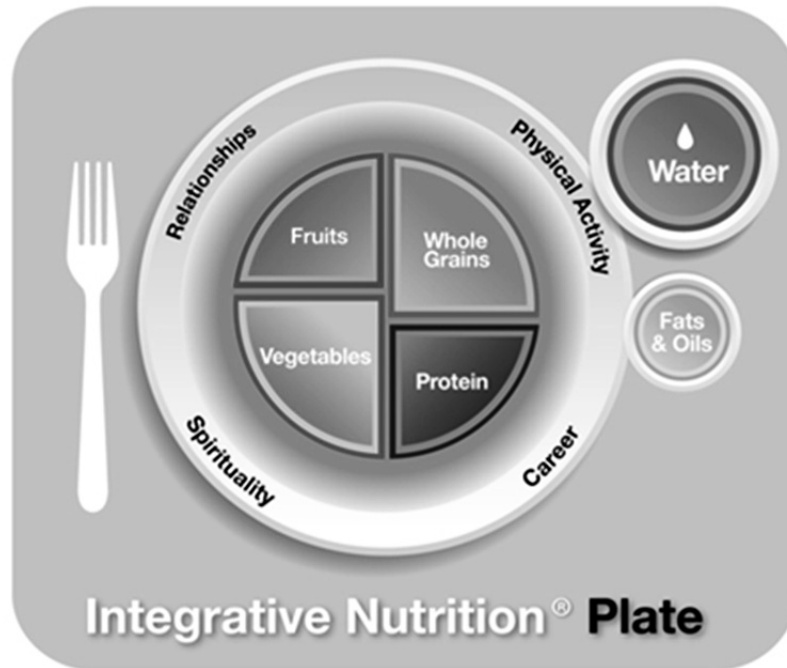
Amputations may result from trauma, peripheral vascular disease (PVD), acute or chronic infections, diabetes mellitus, or tumors. If your amputation is a result of a disease, your physician will emphasize achieving control of the medical condition to prevent further problems, such as additional amputations. Whatever the cause of your amputation, eating nutritionally balanced meals can help to prevent or lessen the chances for these complications.

Immediately after the amputation, adequate protein and calories are important for healing. You also may need supplementation with vitamins and minerals, especially Zinc and Vitamin C.

Maintaining your ideal weight may be difficult. If you are inactive or use a wheelchair as your primary means of mobility, you may tend to gain weight and will need to adopt a low calorie diet as a control measure. (Ex: DASH diet, see appendix A). People with an amputation use more energy than a person without an amputation if you use a prosthesis or assistive device for mobility.

Weight management directly impacts socket fit. For example, if you gain weight (or have a high sodium diet and swelling), your residual limb will become too large for your socket. If you lose weight, your residual limb will be smaller and may need adjustments. Adjustments can be done by sock management as taught to you by your physical therapist or by adjustments to your socket done by your prosthetist. This is to ensure proper fit until your weight stabilizes.

A good diet keeps you healthy by meeting your body's energy needs and by building and repairing body tissues. Good nutrition is all about choosing the right foods in the right amounts.



DO YOU HAVE DIABETES?

You need to take special care of your foot that is remaining since you have diabetes. Some things that you need to do are:

- Wash your foot daily with warm (not hot) water
- Dry your foot completely, taking special care to dry between the toes
- Use a moisturizer daily, but not between your toes
- Trim your toenails straight across. If you cannot reach or see your toes well, your physician may refer you to a **podiatrist** (a special doctor who cares for feet).
- Inspect your foot every day for blisters, cuts, or other issues. You may need a mirror.
- Wear shoes that fit well. The physician may decide you need a special pair of shoes specially made for people that have diabetes.
- DO NOT soak your foot
- DO NOT walk barefoot. Make sure you wear shoes or slippers at all times.

Some things to help prevent complications of diabetes may include:

- 1) Education- you need information on how to properly care for your diabetes and reduce complications.
- 2) Lifestyle changes- You need to stop smoking, eat a healthy diet, and have an exercise program.
- 3) Regular checkups- It's important that you continue to see your physician that is monitoring your diabetes to make sure your blood sugars are controlled to prevent further problems.
- 4) Proper footwear- either well-fitting shoes or those prescribed by your physician are important.

EXERCISE IS KEY!

Exercise has many benefits that include control or lower blood glucose, weight, blood pressure, and cholesterol. It improves the body's ability to use insulin, reduces the risk of heart disease and nerve damage. You need to talk to your doctor before you begin an exercise program, but it is an important aspect of living with diabetes.

If you do develop a wound, you need to see your doctor for proper treatment. It is also important to work with the physical therapist to make sure you are walking properly to decrease additional problems or an occupational therapist to make sure you are using your upper limb prosthetic correctly for activities of daily living.

BLOOD PRESSURE

It is not uncommon to have elevated blood pressure after your amputation. Your **primary care physician (PCP)** may need to manage this with medication. It may be a short term issue or a chronic problem and needs to be addressed.

CARE OF YOUR INTACT “SOUND” LIMBS

You must also pay attention to the care of your intact limbs. With all of the care you are taking with your residual limb, it is sometimes easy to forget that problems can occur with your other extremities too.

Watch the positioning of your intact limbs. Poor positioning can lead to the same contractures you have been trying to avoid in your residual limb. Inactivity can lead to pressure ulcers on your skin if you have limited feeling.

Follow the guidelines from your physician on skin care. Good hygiene, choosing the right shoes, and cutting toenails correctly are just a few things to help to avoid problems.

If you develop a wound on the residual limb, you may need to:

- See your prosthetist if you think it may need an adjustment
- See your physician if it's getting worse, looks infected, or not a prosthetic issue. Be sure to keep it clean and dry and take daily pictures of it to document changes.

SKIN CARE

- Wash your residual limb daily with mild soap and warm water. Rinse thoroughly with clean water to avoid skin irritation. Pat skin dry. Make sure it is completely dry before applying your dressing or ace wrap.
- Do not soak your residual limb as this may soften the skin too much and lead to breakdown.
- To make sure your skin never breaks down, you need to use a mirror to inspect your skin before and after each wearing session. You should check for skin abrasions, blisters, or red marks. Make sure you inspect the back of your limb also. If you notice a problem, remove all sources of pressure or friction until your skin is back to normal. If your skin does not return to normal, contact your physician.
- Eat a balanced diet that promotes healthy skin. (*See Nutrition Section, p.12)
- Do not shave your residual limb as this may irritate your skin.
- Do not apply lotions, creams, or moisturizers to your skin while your

sutures/staples are still in. Once your incision is healed, your physician will instruct you on the proper type of creams to help with your scar and to soften your skin.

- Do not apply cold or hot packs to your residual limb as your sensation may be impaired and extreme hot or cold may damage your skin.
- Do not rub hard over bony areas. To avoid skin breakdown, you will need to take special care of areas where there is not much padding between the skin and underlying bone.

SCAR MASSAGE

Sometimes after an amputation the surgical scar binds down to the tissues under the skin and becomes immobile. This can lead to skin problems at or around the scar site.

After the sutures are removed, your team will instruct you in **scar massage**.

- 1) Place some lotion (Aquaphor®) on the index and middle fingers.
- 2) Once fully healed, apply pressure in all directions, including diagonal. Rub along the scar, across the scar, and in circles around the scar. Be careful not to apply pressure in opposite directions that would open the scar.
- 3) Your team will provide you with instruction on how long and how often you should do scar massage.

PHANTOM SENSATION/PHANTOM PAIN

PHANTOM SENSATION

Nearly every person with an amputation experiences **phantom sensation**, the strange feeling that the amputated limb is still there. You may feel as if your fingers or toes are moving, tingling, or itching. These sensations are different for everyone. If they are particularly bothersome, you should talk with your treatment team.

PHANTOM PAIN

Phantom pain can occur in the form of a burning, aching, squeezing, or crushing feeling in the amputated limb. Many patients describe the feeling as a shocking or electric sensation. As you continue to shrink and shape your residual limb, the phantom pain may decrease. If this pain persists, tell

your physicians, and, if indicated, medication can be prescribed. Your therapist will also work with you to “desensitize” your residual limb.

Fluctuations in your phantom pain are common and can be managed with non-narcotic pain medication. It is helpful to keep a journal of your pain level to determine the best medication. Therapy can also try mirror therapy to reduce phantom pain.

DESENSITIZING

Desensitizing is a process that helps calm down the nerves that produce the phantom sensation or pain. Your therapist will show you techniques such as massage and “tapping” that will help decrease the sensitivity and increase your ability to tolerate pressure on your residual limb.

EXERCISE AND FUNCTIONAL TRAINING

After your amputation a therapist will provide you with an exercise program that is designed to meet your specific needs (see Exercises on p 43). Whether your amputation was recent or some time ago, these exercises are prescribed to maintain or increase muscle strength and flexibility. You will need to perform these regularly.

- ✓ **DO** exercise on a firm surface.
- ✓ **DO** wear your ace wrap or shrinker while exercising.
- ✓ **DO** rewrap your residual limb immediately following exercising if necessary.
- ✓ **DO NOT** hold your breath while exercising- this may increase your blood pressure.

In addition to an exercise program, your therapists will also work with you on functional training. **Functional training** includes exercise, education, and training in skills that focus on your ability to perform daily living activities as independently as possible without prosthesis. If you have amputations of one or both of your upper extremities, you will work on feeding yourself, brushing your teeth, combing your hair, writing, dressing yourself, etc. with assistive devices. If you have amputations of one or both of your lower extremities, you will work on managing a wheelchair and moving between the wheelchair and the bed, toilet, tub, and car. You may

learn how to walk with a walker or crutches. You may also begin standing in the parallel bars with a practice prosthetic device called **PPAM (Pneumatic Post Amputation Mobility) Aid**. The PPAM Aid is a sleeve that is inflated around your residual limb, and then placed in a frame with a foot so that you can begin to practice standing and balance training.

IS A PROSTHESIS A GOAL FOR YOU?

After an amputation, the decision to get a prosthesis is complex and you will have ample opportunity to discuss the pros and cons with your physician and team members. It is important to remember that you can have a full and functional lifestyle without a prosthesis as well as with one.

Some of the questions you may have are:

- “Can I be independent without a prosthesis?” For some, independence is gained with the use of a prosthesis; for others, independence may be more limited with the use of a prosthesis. Many people who decide not to get a prosthesis can be independent with the use of assistive devices, including wheelchair, walker, crutches, adaptive utensils, etc.
- “Will the condition of my health affect my ability to use a prosthesis?” For example, walking with a prosthesis requires more energy than walking prior to your amputation. Persons with certain heart conditions may not be able to tolerate the extra stress of walking with a prosthesis. Your physician will advise you about precautions you must take.
- “Do I want a prosthesis that can be made only for cosmetic reasons (appearance or looks)?” Some people feel more comfortable in a social situation if they have a prosthesis but may not need a prosthesis to function in their daily activities.
- “Does a prosthesis fit my lifestyle and make me more independent?” Learning how to use a prosthesis as well as the daily routine of putting it on, taking it off, and caring for it requires time and energy and will differ among individuals. It is important to consider these factors when determining whether the use of a prosthesis will help you achieve your daily living, work and leisure activity goals.

There may be valid reasons for you to decide not to get a prosthesis right away. Your treatment team will assist you in making the best possible decision. There is no timeline for getting a prosthesis. If you decide to wait, you can pursue a prosthesis at a later time. Reasons you may want to wait are:

- Cardiovascular issues
- Wound healing
- Not mentally prepared
- No transportation to prosthetist/therapy
- Not functional enough yet and need therapy

There are functional levels that must be met before some payer sources will pay for certain components on a prosthesis. Sometimes the clinic will recommend therapy to work on various goals if you are not able to perform some functional tasks. For example, if you have an above knee amputation, some goals for you to work on are:

- Modified independence in all transfers
(Must be able to transfer from wheelchair to walker without assistance from others)
- Modified independence in all bed mobility activities
(Must be able to transfer from bed without assistance from others)
- Sit to stand with modified independence x 5 reps at the least
(Prosthesis will not help with this task so must be able to do it with rolling walker)
- Static standing x 5 min- to build up cardiovascular endurance with rolling walker.
(Must be able to stand without assistance & without falling for 5 minutes)
- Take 5 steps with rolling walker
(Without assistance or falling)

If a prosthesis is not right for you, your rehabilitation team can still work on functional goals to help you achieve greater independence. It is NOT a failure, it is a reasonable choice.

PRE-PROSTHETIC TRAINING

If you and your team decide that you are a prosthetic candidate, you will start PRE-PROSTHETIC TRAINING

Pre-prosthetic training is the therapeutic process you go through after your amputation. During this time, you will learn about the proper care of your **residual limb** (the part of the limb that remains after amputation) and will concentrate on strengthening, wheelchair skills, walking with a walker or crutches and managing your activities of daily living as a person with an amputation. For those with an upper extremity amputation, the focus is on to increase wearing time and for the lower extremity amputation is for weight shift and acceptance.

The following section will outline the basic pre-prosthetic training areas. Your treatment team will help you individualize these areas to meet your specific needs.

SHRINKING AND SHAPING YOUR RESIDUAL LIMB

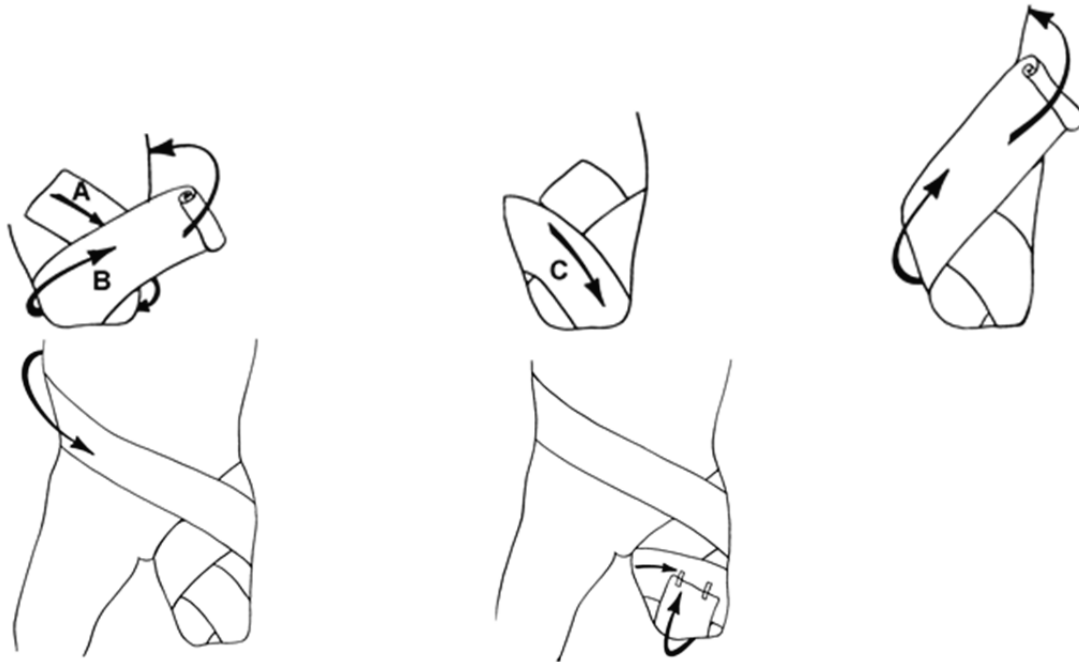
Edema or swelling in the residual limb is common after an amputation. Shrinking and shaping occur when you apply steady, firm pressure to your limb to control swelling in areas consisting mostly of fluid or soft tissue. The ideal shape of a residual limb is firm and cone-shaped (conical). This shape is obtained by applying a **compressive dressing** that is either an **ace wrap** or a **shrinker**. The compressive dressing should be worn at all times except during periods of skin care and bathing. However, it is important to remove the compressive dressing several times a day to check your skin for any signs of irritation and/or breakdown.

ACE WRAPS are 3-4" wide elasticized bandages that are used to provide varied pressure to your limb. When properly applied, ace wraps provide the best shrinking and shaping of a residual limb. Using ace wraps requires more precision than applying a shrinker. Management of swelling in the residual limb is an important step in the process towards obtaining a well-fitting and comfortable prosthesis. Early intervention to minimize swelling is optimal and can include wrapping, use of a shrinker, and lymphedema manual therapy techniques. For increased management, you can ace wrap on top of your shrinker.

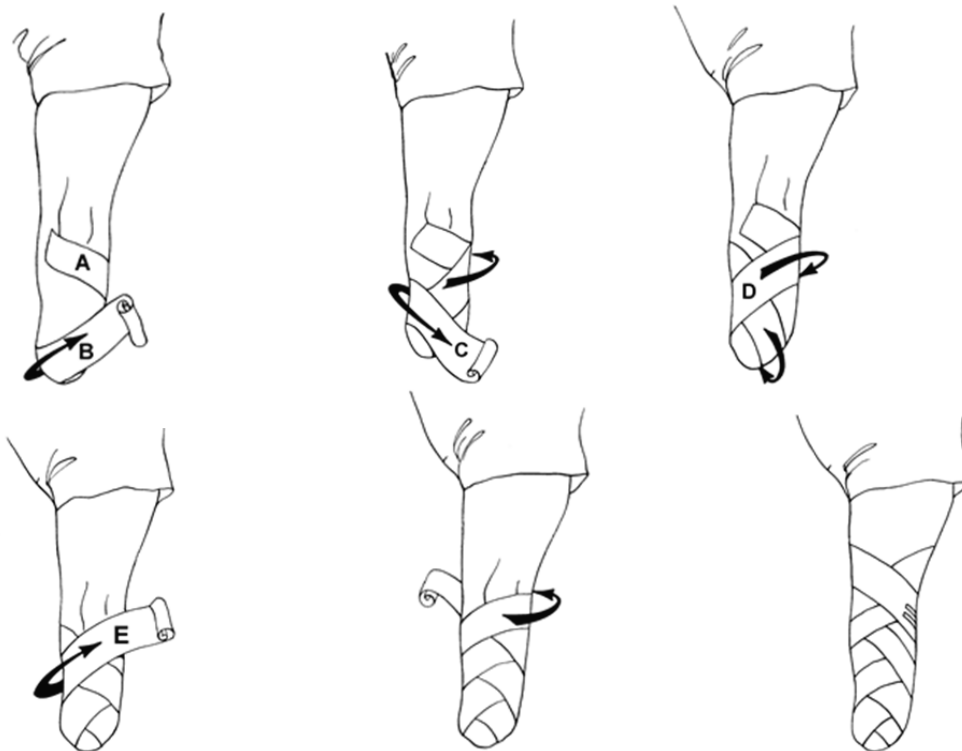
Follow these guidelines to assure proper technique. Your therapist will teach and review these techniques with you.

- Use tape to secure the ace wrap. **Do not use metal clips as they can stick into your skin in you have impaired sensation and cause problems.**
- All turns should be on the diagonal (Figure of 8). If you make circular turns, you could constrict the circulation to your limb, impairing the blood supply.
- Keep your wraps smooth and free of wrinkles. If you have lumps in your ace wrap, they act like pressure points and could lead to skin breakdown.
- Apply most of the pressure at the bottom end of your residual limb and less pressure at the top. This helps your residual limb become conical to fit the socket of a prosthesis.
- Make sure you cover all areas of the limb evenly. Any open areas in the wrap may cause swelling and uneven shrinkage.
- If you have a throbbing sensation, your ace wrap may be too tight. Wrap it again. Also, if your ace wrap slips or is not wrapped well the first time, wrap it again.
- If you have a below knee or below elbow amputation, make sure you wrap your limb to allow your knee or elbow to move to avoid a contracture.
- Take proper care of your wraps and be sure to replace any old bandages. You should not use an ace wrap that has been overstretched.
- You need to wear your shrinker for the first 12-18 months after your amputation to help control edema in your residual limb when your prosthesis is off.

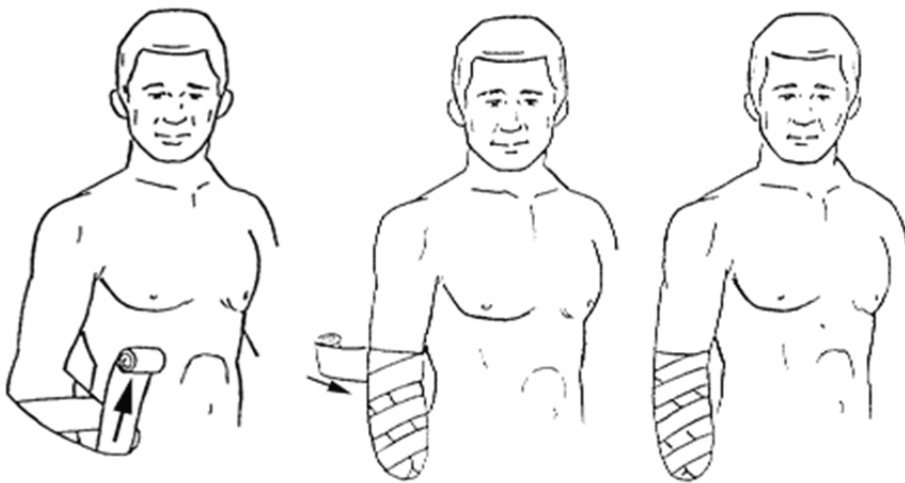
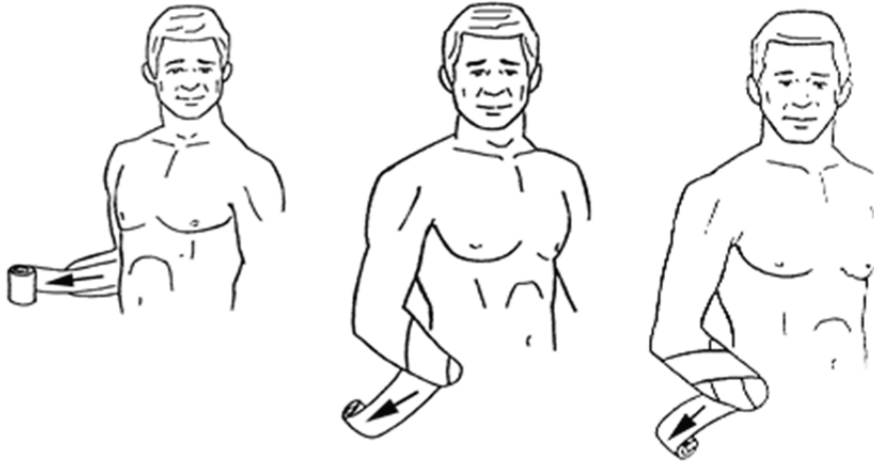
Ace wrapping for persons with above knee amputations:



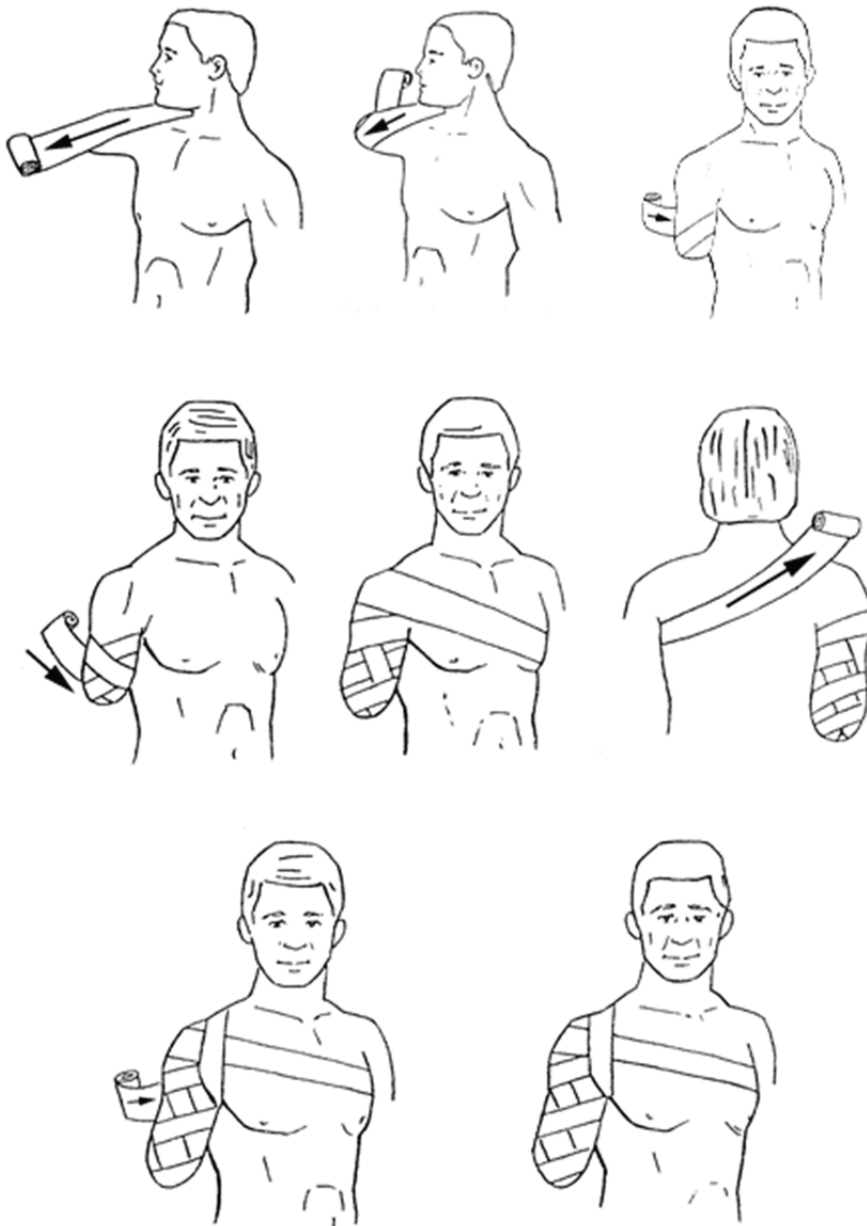
Ace wrapping for persons with below knee amputations:



Ace wrapping for persons with below elbow amputations:



Ace wrapping for persons with above elbow amputations:



SHRINKER (specialized elastic socks used to form the optimal shape of your residual limb)

- The shrinker should be snug and smooth, with no wrinkles.
- As your residual limb shrinks, the shrinker will become too large and may feel loose or fall off. Consult your prosthetist or therapist at this point to get the next appropriate size. You may also need to change the size of your shrinker if you lose or gain weight.
- You will gradually increase the wearing time of your shrinker until you can wear it all the time (all day and all night) except for brief periods when you check your skin for redness. Once your residual limb has become the best possible size and shape, you and the team will decide whether you need to continue using your shrinker.
- You need to wear your shrinker for the first 12-18 months after your amputation to help control edema in your residual limb when your prosthesis is off.

CARE OF YOUR COMPRESSIVE DRESSINGS

- 1) Hand wash with mild soap and warm water and rinse well.
- 2) Remove excessive moisture. Do not twist or wring out.
- 3) Lay on a flat surface to dry so they won't stretch out. Avoid direct heat and sunlight. Do not place in a dryer or hang them up to dry.
- 4) Wear a clean dressing each day.

RANGE OF MOTION

Your therapist will teach you **range of motion** exercises to keep your muscles flexible. After an amputation is performed, the muscles in and around your residual limb may get tight, causing a **contracture**. This may prevent one or more of your joint(s) from moving normally. A residual limb that is limited in motion can interfere with your ability to perform daily living activities. **You may not be a candidate for a prosthesis if you have a contracture.**

GUIDELINES TO AVOIDING CONTRACTURES (or limitation in joint movements)

For leg loss:

- ✓ **DO** lie on your back on a firm surface. Keep your residual limb flat on the bed and kneecap pointed up.
- ✓ **DO** lie on your stomach as much as you can in order to stretch your hip muscles. Keep your buttocks down and legs close together.
- ✓ **DO** sit on a firm surface with equal weight on both hips. Support your residual limb, keep your legs close together, and avoid crossing them.

For arm or leg loss:

- ✓ **DO** continue to actively move all joints in your arms and legs.
- ✓ **DO NOT** put pillows under your arms, hips, knees or between your thighs.
- ✓ **DO NOT** keep your knees or elbows bent for any length of time, either in bed or in the wheelchair.

Pre-prosthetic physical therapy is important for the following reasons:

- ***Learning how to care for residual limb***
Includes swelling, compression, and scar management, as needed
- ***Flexibility and Prevention of Contractures***
Maintaining the appropriate range of motion is important for walking!
- ***Pain Management***
This includes phantom pain and orthopedic pain that can come from tight muscles or poor/sustained postures.
- ***Strength training for core and affected/remaining limbs***
- ***Maintaining/Increasing Cardiovascular (heart) health***
- ***Balance training***
This will be different now that you have an amputation
- ***Learning Mobility- walking and wheelchair***
How to get around with an assistive device, if safe

PROSTHETIC TRAINING

Once you have completed pre-prosthetic training and your prosthesis ready to be delivered, your rehabilitation team will progress you to PROSTHETIC TRAINING.

Prosthetic training is learning how to use your **prosthesis** (artificial limb). You will learn how to put it on, take it off, care for it, and use it in your daily activities. It is also very important to continue with your skin care and range of motion exercises to avoid contractures. A contracture will prevent your prosthesis from fitting and working correctly. You will need to continue to wear your shrinker at night and anytime your prosthesis is off to reduce any phantom pain you may have and to prevent swelling in the residual limb. Your rehabilitation team will individualize your training based upon your goals that have been set by you and your therapist. There are many different choices available for your prosthesis depending on your level of amputation. Your rehabilitation team will guide you determining which components are best for you and your lifestyle. **(See chart in Appendix B)**

THE PROSTHESIS

HOW DO I CHOOSE A PROSTHETIST?

Choosing a certified prosthetist is an important decision as you will spend a lot of time with him/her making your prosthesis. We recommend that he/she is American Board Certified (ABC), the facility is licensed by the state and you are comfortable with their experience with your level of limb loss. You can find this information at www.abcop.org. Search for accredited facilities and prosthetists.

It is your choice on which company you would like to use, however we can provide you some information upon request that fit TIRR Memorial Hermann's vendor criteria. Once you have picked a couple of locations to visit, they will assist you in determining your insurance benefits as some are listed under different names on insurance plans.

Additional Considerations:

- Facility accredited
- Licensed/certified
- Rapport
- Goals
- Experience
- Accessibility

Frequently Asked Questions:

You can use these questions as a guideline when you meet with different prosthetic companies in preparation for your prosthesis. These are only a sample of questions that you may have so feel free to add your own.

1. How many _____ do you fit in a month? (transradial, transhumeral, transtibial, transfemoral)
2. Do you accept my insurance? What is included in the price?
3. Do you make your own sockets or send them out?
4. How long will it take from casting to fitting? How many visits and for how long?
5. How quickly can I be seen when I call for an appointment?
6. Why do you enjoy upper limb prosthetics? Or lower limb?
7. How long is the evaluation process?
8. Are you comfortable with creative designs, progressive materials, and advance electric components?
9. Do you have any educational material or resources for me today?

HOW IS MY PROSTHESIS MADE?

You and your rehabilitation team will decide when it is time for you to get your prosthesis. This will usually occur when you have healed completely, are able to tolerate weight/pressure through your residual limb, the swelling has stabilized and the shape is appropriate. You will then be referred to a **prosthetist** (a specialist who makes artificial limbs). This usually occurs approximately 4-6 weeks after surgery, assuming there are no complications or other factors to consider.

Your prosthesis will be designed to be as comfortable as possible while providing the most mobility, stability, functionality and best appearance to fit your lifestyle. Your prosthesis may need to be replaced periodically due to wear and tear of the prosthesis, or changes in your limb or functional status. Ongoing communication with your prosthetist is essential as advancing technology continues to improve the design and function of artificial limbs.

Fabrication

After taking accurate measurements of your limb, the prosthetist will make a plaster cast of your limb and then remove the plaster cast when it has dried. The cast is then filled with plaster so it creates an exact mold of your limb. From this, the prosthetist can make a custom fit **socket** (the hollow area of the prosthesis where your residual limb fits) for your limb. All of the **components** (see below) are attached to the socket. After the prosthetist checks the fit of the socket and makes any adjustments, it is then laminated to match your skin color. As your limb changes and shrinks, the prosthetist will make periodic adjustments to the socket until optimal fit and function are achieved. After you are discharged from the hospital, you should contact your prosthetist for any further adjustments.

If you have a lower extremity amputation, it is important to take a pair of sturdy athletic shoes to the first casting session. The shoes will determine the alignment of the prosthesis. Once you have completed training with your prosthesis, you will be able to wear different kinds of shoes. Your prosthetist or therapist will show you how to adjust your shoes to maintain proper alignment of your prosthesis.

Components

What are components? Components are the parts that make up your prosthesis and may include the foot, knee, harness, wrist and/or liner. There are many different components that you will read and/or hear about--each with different functional features. Different components are chosen for you according to your lifestyle, age, physical condition, level of amputation, etc.

What is prescribed for your first limb might not be what is prescribed for your second or subsequent limbs. (See component chart in Appendix B)

WEARING YOUR PROSTHESIS

Putting your prosthesis on and taking it off are commonly referred to as “**donning**” (putting on) and “**doffing**” (taking off). When you first begin to wear your prosthesis, it may feel strange. If it is very uncomfortable or painful, consult your therapist to help determine the cause. If your prosthesis continues to be painful or if you continue to have red areas on your skin, your prosthetist may need to adjust the fit of the prosthesis.

Regardless of the type of socket you have, it is important that you check your skin each time before putting on and after removing your prosthesis. If you see any redness that does not go away within 10-20 minutes, try to problem-solve the cause. Do not wear the prosthesis again until the reddened area is gone or until you have discussed it with your doctor, therapist, or prosthetist. Be sure to bring your prosthesis to therapy fully charged, if it is a myoelectric or microprocessor.

USING STUMP SOCKS (*residual limb socks*)

Some socket types require the use of **stump socks**. Stump socks are fabric socks that may be applied to the residual limb to assist in the proper fit of the prosthesis. These socks come in different materials and thicknesses (**ply**). Your therapist will help you determine the number of ply needed for proper socket fit. Your prosthesis is built to the size of your residual limb at the time of casting. As your residual limb shrinks over time or has swelling, you may need to add or subtract socks to maintain the proper fit of your socket. You will need to learn the “feel” of the socket when

the ply is correct so you may adjust it in the future. Be sure to bring your socks every time to therapy. Sweating is a common issue. There are specialized socks that can be used for excessive sweating. In addition, to anti-perspirants (ie: Certain Dri)

GUIDELINES TO SUCCESS IN USING SOCKS

- Know how to adjust the number of ply for proper fit.
- Avoid major changes in your weight. Weight loss or gain can change how your socket fits.
- Wear clean socks every day.
- Make sure there are no wrinkles in your socks. If there are wrinkles, this can cause discomfort or lead to skin breakdown.
- Carry extra socks at all times, in case of sweating or shrinking

SKIN CARE

It is common to have various skin issues while wearing a prosthesis. Your physician may recommend one of the following treatments to clear up your skin.

- Bleach baths- your physician will give detailed instructions
- Anti-fungal skin infections- use topical over the counter cream to the affected area at night
- Bacterial infections- your physician may prescribe medication
- Excessive moisture- use topical over the counter antiperspirant
- Liner hygiene- wash liner well each day and hang to dry

CARE OF YOUR PROSTHESIS

The inside of your socket needs to be cleaned daily to remove build-up of dirt and sweat. Wipe the socket with a damp cloth and mild detergent, such as liquid antibacterial hand soap. If you have pads in your socket, try not to get them wet. Allow the prosthesis to dry completely before donning. For a more thorough cleaning, you will also need to wipe the socket (and inserts) with rubbing alcohol once a week. Let your prosthesis air-dry at night when you take it off. You should be sure to place your prosthesis in a safe location away from extreme heat or cold. Also keep it away from pet and pet dander so it will function optimally.

PROGRESSING IN THERAPY

Once your prosthesis has been fitted, you will begin functional training. If you have an upper extremity prosthesis, training may include putting it on and taking it off (donning and doffing), dressing, grooming, eating, and other functional tasks. If you have a lower extremity prosthesis, the focus may be on donning, doffing, balance, walking, managing stairs and ramps, and more advanced skills.

Prosthetic physical therapy focuses on the following:

- ***Learning management of your prosthesis***
This includes how to put it on/take it off, cleaning the prosthesis, appropriate times to wear prosthesis, sock management, edema control, how to protect skin/skin inspections to prevent sores, etc.
- ***Further Pain management***
This can include phantom pain or pain from wearing the prosthesis.
*Therapists can assist you to know when prosthesis adjustments are necessary.
- ***Further flexibility and contracture management***
- ***Strengthening for appropriate prosthesis use***
- ***Retraining standing balance with Prosthesis***
This will improve mobility, prevent poor movement/compensations, and help prevent falls!
- ***Training for walking in a prosthesis***
- ***Floor recovery with a prosthesis***
This is important in case you do fall.
- ***Community Reintegration***
Time to get back to the activities you want to do.
- ***Vocational/Return to Work***

Settings

If you are admitted to the inpatient or outpatient program, you will receive therapy two to six days per week, depending on the setting. The amount of therapy may increase as your wearing tolerance progresses. Total therapy for inpatient is usually three hours per day and includes education,

exercises, introduction to assistive devices, adjustments to your prosthesis and pre-prosthetic training.

If you are in the outpatient program, you will receive therapy two to three days per week. Total therapy is usually one to two hours per day depending on your individual needs. Your therapist will guide you in increasing your prosthetic wearing time, skin checks and will develop a home exercise program for you to continue when you are at home.

In an outpatient program, you are responsible for providing your own transportation to/from therapy and to/from your prosthetist for all necessary adjustments that you and your therapist feel are needed.

Upper Extremity Amputations

Some activities to expect in therapy are exercises to stretch your remaining muscles and strengthen them for functional activities. Your therapist will instruct you on how to monitor your skin for redness and increase your prosthetic wearing time. After learning how to apply the prosthesis, you will then learn how to open and close the terminal device and the basic operations of the prosthesis. Once this has been achieved, you will then move into incorporating the prosthesis into your activities of daily living (i.e. hygiene, feeding). Lastly, therapy will focus on utilizing your prosthesis in work and leisure activities. Expect that adjustments to your prosthesis will need to be made while you are working on various functional tasks. It is not uncommon to go back and practice tasks that were previously learned. You may also be asked to perform an activity in several different ways to determine which method works for you.

Basic skills:

- Donning/doffing (putting it on/taking it off)
- Grasp/release

Advanced skills:

- Open containers
- Zippers/Tying shoes

Overuse in the Upper Extremity

People with congenital or acquired upper limb amputations have a higher incidence of overuse syndrome, also known as repetitive strain injury (RSI). Overuse injuries in the upper limb can include rotator cuff strain, biceps tendonitis, lateral epicondylitis (also known as tennis elbow), or carpal tunnel syndrome (CTS). These injuries can occur when higher than normal demands are placed on one limb rather than sharing the load with both limbs. Overuse injuries can be prevented by performing regular strengthening and stretching exercises targeting back and arm musculature, incorporating both limbs with or without prosthesis when applicable, and performing tasks with proper body mechanics and posture. Your therapist will provide you with instruction on appropriate type and frequency of exercises, education on the use of ice or other modalities, and education on avoidance of repetitive activities that may increase your risk of an overuse injury.

Lower Extremity Amputations

Your therapy will include exercises to stretch the muscles around the residual limb and to strengthen all your muscles. Your therapist will also instruct you on monitoring your skin for redness and increasing your prosthetic wearing time. After you learn how to properly apply the prosthesis, you will begin balance training. You will then progress to shifting your weight from side to side and learn how to accept and trust your full body weight on the prosthesis. When you are ready to begin walking, you may start in the parallel bars and then progress to a walker, crutches, cane or possibly no assistive device. Lastly, therapy may focus on learning advanced skills, such as how to walk up and down curbs and stairs and on performing other advanced activities, such as sports. It is not uncommon to require several trips to the prosthetist to make adjustments to the prosthesis to increase comfort, safety or help you walk safely with the prosthesis.

Basic skills:

- Balance
- Don/doff
- Transfers
- Skin checks
- Wearing schedule

Advanced skills:

Uneven ground

Stairs

Ramps

Curbs

Running

Fall

Stand Recovery

Overuse in the Lower Extremity

If you decide not to use a prosthesis, you may have a higher incidence of overuse syndrome. Overuse injuries in the lower limb can affect the hip, knee, back and/or foot. These injuries can occur when higher than normal demands are placed on one limb rather than sharing the load with both limbs. Overuse injuries can be prevented by performing regular strengthening and stretching exercises targeting core musculature and performing tasks with proper body mechanics and posture. Your therapist will provide you with instruction on appropriate type and frequency of exercises, education on the use of ice or other modalities, and education on avoidance of repetitive activities that may increase your risk of an overuse injury.

FOLLOW-UP

It is important that you continue to see your physicians on a regular basis. Your physicians will monitor your medical and functional status. It is important to follow up with your rehabilitation team to ensure your skin is healthy, gait is optimal, and supplies are all working correctly.

It is important that you know what the optimal fit of your prosthesis feels like so that you recognize any changes that may occur. Make an appointment to see your prosthetist if you develop any pain or reddened areas that do not go away. Minor adjustments during the first year may be covered under the purchase warranty. **If you have an open area or blister, discontinue the use of your prosthesis until you see your physician.** It is essential that you do not wear your prosthesis until your skin is healed. Once your skin is healed and you are ready to wear your prosthesis again, you will

need to increase your wearing time gradually as you did when you first started to wear the prosthesis. You may need to resume use of your shrinker or ace wrap if you experience a recurrence of swelling.

Community Re-entry

Towards the end of your therapy, your therapist or physician may make some additional referrals so that you may return to your previous lifestyle. These may include vocational training, a driving program, or a work hardening program. You may also want to get information on adapted sports and leisure activities.

- Amputee Support Group (Houston Amputee Alliance)
- Social Resources - You may be eligible for some additional resources, depending on your financial status and other factors. Clinic can help provide you with some information for assistance in programs, such as Medicaid, food stamps, Metrolift, Department of Rehabilitation Services (DARS) funding, etc. A consult for a social worker is sometimes necessary to determine your needs.
- Wheelchair (WC) and Equipment needs - Your equipment and wheelchair needs can be discussed during clinic. Most people are discharged from the hospital with a rental chair. We frequently prescribe a visit to the Wheelchair Clinic for an evaluation for an appropriate wheelchair. Other equipment discussed could include assistive devices, bathroom equipment, adaptive equipment, etc. insurance coverage varies according to the policy and type of equipment.
- Driving Program- By law you must report your amputation to the Department of Public Safety. If you were already a licensed driver, you may have to retake the driving test if you are planning on using your prosthesis to drive. Some possible vehicle adaptations include steering wheel adaptations, secondary controls, or left foot accelerator.
- Work Training and FCE (Functional Capacity Evaluation) - A work simulation program helps to identify any limitations that you may have in your job setting. This program of activities is specially designed to ensure that you are able to perform your job duties safely and efficiently with reasonable adaptations.
- If your goal is to return to work, your rehab team can assist you with this process.

- Vocational Training and Counseling- You may be referred to a vocational counselor or your state's vocational rehabilitation department to help you get back to your job or a different job with your former employer. Vocational testing may be necessary to identify your job skills and interests if return to your former employment is not a possibility. The ADA (American with Disabilities Act) can provide information on your rights regarding reasonable accommodations. **(See the Resource Section)**
- Sports and Leisure- Sports and leisure can still be a part of your life following your amputation. You may want to consult with a therapeutic recreation specialist who can help determine how you can participate in your special interests. There are many adaptations available for cooking, fishing, golf, hunting, skiing, and many other activities. For travel, consult with your travel agent for any special accommodations that you may require.

RESOURCES

Information and Referral

Amputee Coalition (1-888-AMP-KNOW)

Information, referrals and database of resources on sports, adaptations, support groups, technology and agencies for people with limb loss. Publishes the informative "In Motion" magazine.

www.amputee-coalition.org

National Resource Directory (501) 666-9540

Published by American Amputee Foundation. Directory comprised of lists of organizations, support groups, publications, sports, vocational services, etc. A fee is charged for this service.

U.S. Dept. of Veterans Affairs (800) 827-1000

If you are a veteran, inquire with this office concerning possible benefits.

www.pva.org or www.va.gov

ILRU, ilru@ilru.org

Founded in 1975, it provides research, education

American Amputee Foundation (501) 666-2523

700 S. Pine, Little Rock, AR 72205.

211 United Way Information and Referral

24 hour information hotline. Dial 211 for 24 hour a day assistance with basic needs such as food, utilities, healthcare. <http://www.unitedwayhouston.org>

Texas Paralyzed Veterans of America (713) 794-7994

Information and referral services for disabled veterans.

Advocacy, Inc. (713) 974-7691 or (800) 880-0821

Provides advocacy and legal information to disabled individuals and families.

Memorial Hermann/TIRR website: <http://www.memorialhermann.org>

Amputee-Online: www.amputee-online.com.

Support and Counseling Services

AA Interagency (713) 686-6300

Provides information and locations of area 12-step meetings (AA, NA, Al-Anon, etc.). Al-Anon is the 12-step group for family members of alcoholics or drug users. Not all meetings are wheelchair accessible.

Veterans Administration Medical Center (713) 791-1414
Counseling services available for veterans.

Family Services Centers (713) 861-4849
Offers individual and family counseling on a sliding scale basis.

Family Services of Greater Houston (713)861-4849
www.familyservices.com,

Diabetes Resources:

American Diabetes Association, 1701 North Beauregard Street. Alexandria, VA 22311, 1-800-342-2383, www.diabetes.org

National Diabetes Information Clearinghouse, 1 Information Way, Bethesda, MD 20892-3560, 8020-860-8747, www.diabetes.niddk.nih.gov

Vocational Services

Texas Work Commission

In Houston, contact the Regional Office at (713) 977-2613. They will put you in contact with your closest office depending on your zip code.

The Americans with Disabilities Act (ADA)

Signed into law on July 26, 1990, this act bars discrimination by both private business and state and local governments in employment, public accommodation, public services, transportation and telecommunications. For more information, contact Paralyzed Veterans of America, (888) 860-7244, to obtain a handbook entitled "*The Americans with Disabilities Act- Your Personal Guide to the Law*."

Transportation Services

MetroLift: www.ridemetro.org, 713-225-0119. This is a low-cost door to door transportation if you qualify.

American Red Cross: www.houstonredcross.org, 713-313-1631

Harris County Rides: www.harriscountyrides.com, 713-368-7433

Equipment

RSVP- Rehabilitation Services Volunteer Project is an all-volunteer, nonprofit organization that helps find physical rehabilitation services and equipment to uninsured individuals with disabilities.

The **RSVP-Clinic** provides outpatient services to individuals with brain injuries, spinal cord injuries, and amputations. These services include medical care, nursing care, pharmacist management, physical therapy, occupational therapy, speech therapy, neuropsychological evaluation, social work and spiritual care.

The **RSVP-MED** equipment division gives long term loans of durable medical equipment (such as wheelchairs, bathroom equipment, and walkers) to individuals in our community with disabilities (regardless of diagnosis) who lack access to this equipment.
<http://www.rsvptexas.org/>

Sports and Leisure

The Metropolitan Multi-Service Center (832)395-7333

1475 West Gray, Houston, TX 77019. The City of Houston operates this multi-service center. This facility accommodates health, fitness, sports, and educational, cultural, social service and community activities for people with disabilities. A wheelchair accessible indoor pool, gym, and auditorium, and accessible playground are available. Please call for the monthly schedule.

<http://www.houstontx.gov/parks/adaptivesports.html>

Vern Cox Multi-Service Center (281)487-1755

The recreation center is specifically dedicated to activities, programs and events for youth and adults with disabilities. Special Olympics, aquatics, wheelchair softball are a few options offered. 5200 Burke Road, Pasadena, TX 77504

http://www.ci.pasadena.tx.us/default.aspx?name=prk.fac-v_cox

City of Pearland Adaptive Recreation

Offers various adaptive recreation activities, including crafts, cooking, shooting, and wheelchair sports

<http://pearlandtx.gov/departments/parks-recreation/programs/adaptive-recreation>

TIRR Sports, Peggy Turner at peggy.turner@memorialhermann.org. Please contact TIRR for information on basketball, golf, rugby, cycling, sitting volleyball, swim team or Camp Xtreme sports camp.

Turning Point, (409) 684-4402, (409) 939-4827, David Gaston, www.turningpoint1.com. Designed to teach people with mobility impairments skills to enjoy fishing, sailing and hand cycling.

Texas Adaptive Aquatics, Roger Randle, 281-324-4653

Features and outstanding adaptive water organization with 3 acres on Lake Houston that offers water skiing, sailing, hunting and kayaking for people with disabilities.

The following are examples of sports that are available. It is by no means a complete listing.

Skiing

Adapted Sports Center; Chris Hensley (970) 349-2296.

Challenge Aspen; Amanda Boxtel; (970) 923-0578.

National Sports Center for the Disabled (970) 726-1540.

Golf

National Amputee Golf Association (NAGA) (800) 633-NAGA.

Tennis

United States Tennis Association (914) 696-7000, Fax (914) 696-7029.

Basketball

National Wheelchair Basketball Association (615) 696-9205.

mpdaviarn@aol.com

Rugby

TIRR Hurricanes, Alan Bailey, (281) 996-0622.

Travel

Mobility International (541) 343-1284

miusa@igc.apc.org. A well respected organization that promotes global understanding and exchange by persons with disabilities. Also have many resources on accessible travel worldwide.

<http://www.projectaction.org>. Helps travelers with limited mobility plan trips to cities across the country. Provides extensive, city-by-city information on public transit systems as well as private, hotel/motel shuttle services, airports, taxis and national 800 numbers to assist in travel plans.



T.A.S.K. (TIRR Amputee Survival Kit)

(Adapted from Rick Riley, CP)

- Pair of small scissors and small towel
- Small tool kit
- Extra terminal device for upper extremity prosthesis
- Extra liner
- Extra stump socks for unexpected shrinkage that changes the fit of your prosthesis
- Stump shrinker or ace wraps to reduce swelling
- Aspirin, ibuprofen or acetaminophen for relief of minor pains
- Hydrocortisone cream for itching or rash
- Skin lotion for dry skin or lubrication
- Topical antibiotic for minor sores
- Alcohol wipes to clean socket
- Antibacterial soap
- Tegaderm®, Second Skin®, etc. for small abrasions
- Duct tape for temporary repairs
- Backup battery and charger for myoelectric users

LOWER EXTREMITY STRETCH

If your level of amputation is different from what is pictured below, your therapist will assist you in making any necessary adjustments to the exercises.

Hip Flexor Stretch- on your back (preferred method)

Lie on your back. Bend both legs and pull them towards your chest. Reach behind your intact thigh and hold it at your chest. (Fig. 1a) Lower your residual limb toward the surface. You may feel a gentle stretch in the front part of your hip of the residual limb. If you have a below knee amputation, straighten your knee and make sure your kneecap points toward the ceiling. Hold the stretch for 30 seconds. (Fig. 1b)

Relax.

Repeat _____ times _____ per day.

Repeat the stretch with your other leg.



Fig.1a



Fig. 1b

Hip Flexor Stretch- on your stomach (alternate method) (Fig. 2)

Lie on your stomach with your legs straight.

Place a towel roll under your residual limb. Put it above your knee if you have a below knee amputation.

You should feel a gentle stretch in the front part of your hip of the residual limb.

Relax.

Repeat _____ times _____ per day.



LOWER EXTREMITY EXERCISES

Quadriceps Sets (thigh muscle) - *no picture included*

Lie on your back with your intact leg bent and your foot flat on the surface.

Tighten the thigh muscle of your residual limb by pushing your knee into the surface.

Hold for 5 seconds.

Relax.

Repeat _____ times _____ per day.

Gluteal Sets (buttocks) - *no picture included*

Lie on your stomach with your legs straight.

Squeeze your buttocks together.

Hold for 5 seconds.

Relax.

Repeat _____ times _____ per day.

Sitting Adduction- *no picture included*

Sit on a firm surface.

Place a towel roll between your legs.

Squeeze the towel roll.

Hold for 5 seconds.

Relax.

Repeat _____ times _____ per day.

Sitting Hip Extension- *no picture included*

Sit on a firm surface.

Place a towel roll under your residual limb.

Push down into the towel.

Hold for 5 seconds.

Relax.

Repeat _____ times _____ per day.

Hip Abduction/Adduction (gravity eliminated)

Lie on your back with your legs straight.

Place a towel roll between your thighs. (Fig. 6a)

Move your residual limb out to the side. Keep your kneecap towards the ceiling if you have a below knee amputation. (Fig. 6b)

Bring your leg in. Squeeze the towel roll for 5 seconds.

Relax.

Repeat _____ times _____ per day.



Fig. 6a

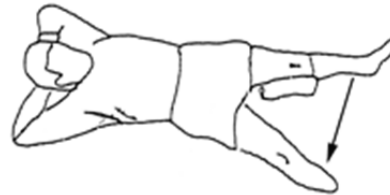


Fig. 6b

Hip Abduction (against gravity)

Lie on your side with your residual limb on top. (Fig. 12a)

Lift your residual limb up about 12 inches. (Fig. 12b)

Keep your hips rolled forward. If you have a below knee amputation, keep your kneecap facing forward.

Pause, and then slowly lower to the surface.

Relax.

Repeat _____ times _____ per day.



Fig. 12a



Fig. 12b

Hip Abduction Progression (CATCAM)

Lie on your side with your residual limb on the bottom.

Place a towel roll under your residual limb.

Bend the hip and knee of the intact limb to 90 degrees and place a stool under it. (Fig. 13a)

Press the residual limb firmly into the towel, raising your hip off the surface. You should only be able to slide your hand between your raised hip and the surface. (Fig. 13b)

Pause, and then slowly lower to the surface.

Relax.

Repeat _____times _____per day.



Fig. 13a

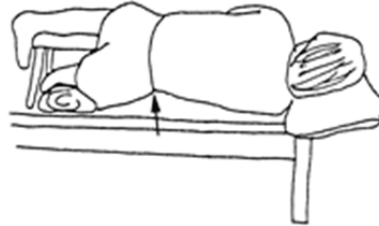


Fig. 13b

Hip Extension- (against gravity)

Lie on your stomach with your legs straight. (Fig. 8a)

Lift your thigh off the surface toward the ceiling without lifting your pelvis. If you have a below knee amputation, keep the knee of your residual limb straight. (Fig. 8b)

Pause, and then slowly lower your leg to the surface.

Relax.

Repeat _____times _____per day.



Fig. 8a



Fig. 8b

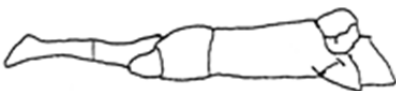


Fig. 8a



Fig. 8b

Hip Extension- (CATCAM)

Lie on your back with your legs straight.

Place a small towel roll under the end of your residual limb. (Fig. 4a)

Push into the towel to lift your buttocks slightly off the surface. Keep your hips level as you lift. (Fig. 4b)

Pause, and then slowly lower to the surface.

Relax.

Repeat _____times _____per day.



Fig. 4a

Fig. 4b

When you are able to lift your buttocks easily, you can progress to bending and lifting your intact leg while lifting your buttocks. (Fig. 4c)



Fig. 4c

Bridges

Lie on your back with your intact leg bent and your foot flat on the surface and your arms by your sides. (Fig. 5a)

Push down with your foot into the surface while lifting your buttocks up. Make sure the hip of your residual limb is level with the other side. (Fig. 5b)

Pause, and then slowly lower your hips to the surface.

Relax.

Repeat _____ times _____ per day.



Fig. 5a



Fig. 5b

Knee Flexion

Lie on your stomach with your legs straight. (Fig. 10a)

Bend the knee of your residual limb without lifting your pelvis. (Fig. 10b)

Relax.

Repeat _____ times _____ per day.



Fig. 10a



Fig. 10b

Knee Extension (Quadricep strength)

Sit on a firm surface. (Fig. 15a)

Straighten the knee of your residual limb. (Fig. 15b)

Pause, and then slowly lower your residual limb.

Relax.

Repeat _____ times _____ per day.



Fig. 15a



Fig. 15b

Straight Leg Raise (Quadricep strength)

Lie on your back with your intact leg bent and your foot flat on the surface. (Fig. 3a)

Tighten the thigh muscle of your residual limb and lift it towards the ceiling. You do not need to lift it higher than your bent knee. (Fig. 3b)

Pause, and then slowly lower your leg to the surface.

Relax.

Repeat _____ times _____ per day.



Fig. 3a



Fig. 3b



Fig. 3a

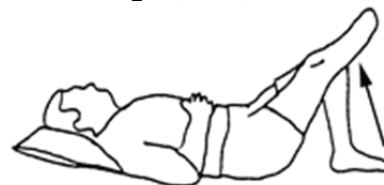


Fig. 3b

Hip Adduction Progression (CATCAM)

Lie on your side with the residual limb on top of a stool. You may place a towel or pillow on the stool for comfort. (Fig. 14a)

Press the residual limb into the stool raising the lower hip off the surface. You should only be able to slide your hand between your raised hip and the surface. (Fig. 14b)

Pause, and then slowly lower to the surface.

Relax.

Repeat _____ times _____ per day.

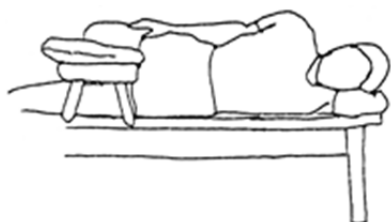


Fig. 14a

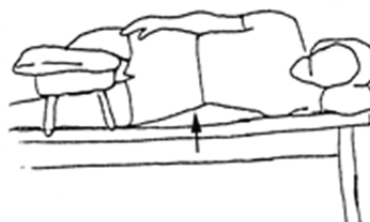


Fig. 14b

Back Extension

Lie on your stomach with a towel between your legs.

Cross your arms behind your back. (Fig. 11a)

Squeeze the towel between your legs while raising your legs and head off the surface. (Fig. 11b)

Pause, and then slowly lower to the surface.

Relax.

Repeat _____ times _____ per day.



Fig. 11a



Fig. 11b

Trunk Rotation

Sit on a firm surface or chair.

Hold a wand or stick in your hands with your palms facing down.

(Fig. 16a)

Raise the stick to shoulder height and slowly rotate it from side to side. (Fig. 16b)

Be sure your buttocks do not lift off the surface.

Repeat _____ times _____ per day.



Fig. 16a



Fig. 16b

Single Leg Stance- *no picture included*

Stand at your counter or other firm surface resting your hands

Lift your sound leg onto a raised surface without bending forward or leaning to the side and gently touch the top of the surface

Lower your leg back to the ground.

Be sure to control the movement.

Repeat _____ times _____ per day.

Side stepping- *no picture included*

Stand at your counter or along the hallway (per therapists' instruction)

Make sure your toes face forward at all times and you stand upright.

Step out with your left foot, step in with your right foot.

Continue _____ times and repeat the other way.

UPPER EXTREMITY EXERCISES

If your level of amputation is different from what is pictured below, your therapist will assist you in making any necessary adjustments to the exercises.

Shoulder Elevation (Fig. 1)

Stand with your arms at your sides.

Shrug your shoulders up toward your ears.

Pause, then lower.

Relax.

Repeat _____ times _____ per day.

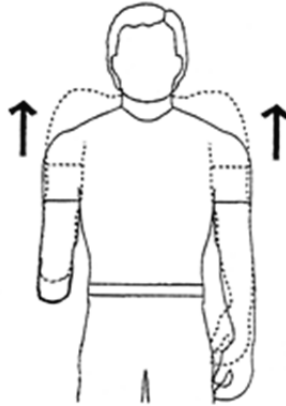


Fig. 1

Shoulder Depression (Fig. 2)

Stand with your arms at your sides.

Squeeze your shoulder blades down and then in.

Relax.

Repeat _____ times _____ per day.



Fig. 2

Shoulder Retraction (Fig. 3)

Sit or stand with your arms at your sides.

Squeeze your shoulder blades together while keeping your shoulders down.

Pause, then return to start position.

Relax.

Repeat _____ times _____ per day



Fig. 3

Shoulder Protraction (Fig. 4)

Lie on your back and lift your residual limb straight up.

Move your residual limb toward the ceiling. Keep your elbow straight if you have a below elbow amputation.

Slowly lower it back to the starting position.

Relax.

Repeat _____ times _____ per day.



Fig. 4

Shoulder Flexion (Fig. 5)

Stand with your arms at your sides.

Slowly raise your residual limb in front of your body until you reach overhead. Keep your elbow straight if you have a below elbow amputation.

Pause, then slowly lower your arm back down to your side.

Repeat _____ times _____ per day.



Fig. 5

Shoulder Extension (Fig. 6)

Stand with your arms at your sides.

Move your residual limb backwards. Keep your elbow straight if you have a below elbow amputation.

Pause, and then slowly return your arm back to your side.

Relax.

Repeat _____ times _____ per day.



Fig. 6

Shoulder Abduction/Adduction (Fig. 7)

Stand with your arms at your side as if your palm was facing forward. Lift your residual limb out to the side and up overhead. Keep your elbow straight if you have a below elbow amputation.

Pause, and then slowly return your arm to your side.

Relax.

Repeat _____ times _____ per day.

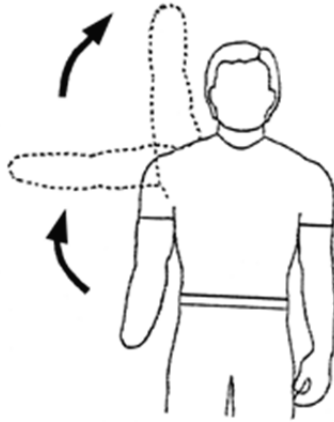


Fig. 7

Horizontal Abduction/Adduction (Fig. 8)

Stand or sit with your residual limb out to your side at 90° with palm forward.

Bring your arm across your body toward your other shoulder. Keep your elbow straight if you have a below elbow amputation.

Slowly return your arm out to the side.

Relax.

Repeat _____ times _____ per day.

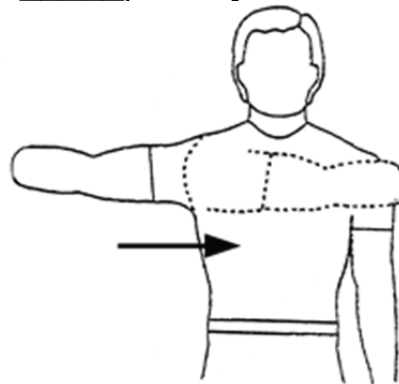


Fig. 8

Internal/External Rotation (Fig. 9)

Lie on your back with your residual limb out to the side, level with your shoulder. If you have a below elbow amputation, bend your elbow.

Place your other hand on the front of the shoulder to keep the shoulder from coming off the surface as your arm rotates.

Rotate your arm so that your hand would move toward your feet.

Rotate your arm up so that your hand would move toward your head.

Relax.

Repeat _____ times _____ per day.

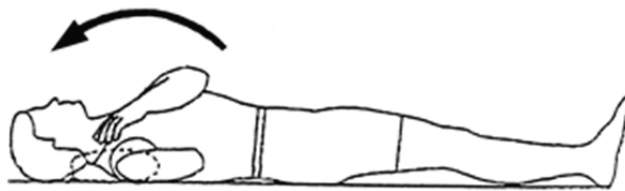


Fig. 9

Elbow Flexion/Extension (Fig. 10)

Sit or stand with your arms at your side.

Bend the elbow of your residual limb like you would be bringing your hand to your shoulder.

Pause, and then slowly straighten your elbow.

Relax.

Repeat _____ times _____ per day.

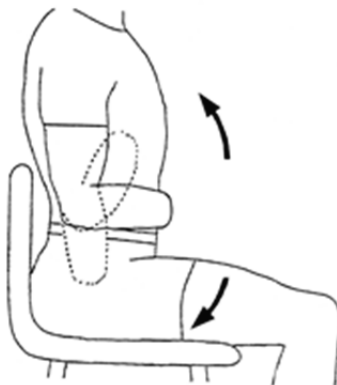


Fig. 10

Supination/Pronation (Fig. 11a and 11b)

Hold the elbow of your residual limb at the side of your body with your elbow bent.

Rotate your arm so that the palm of your hand would face the floor.

(Fig. 11a)

Rotate your arm so that the palm of your hand would face the ceiling.

(Fig. 11b)

Relax.

Repeat _____ times _____ per day.



PALM UP

Fig. 11a



PALM DOWN

Fig. 11b

ISOMETRIC CONTRACTION EXERCISES

These exercises are used for general strengthening after injury and to prepare you for the use of a myoelectric prosthesis if it is appropriate.

Elbow Extension (Fig. 12)

Sit at a table and place your residual limb on top with your elbow bent so that your palm would face down.

Push down against the table and hold for 10 seconds.

Relax.

Repeat _____ times _____ per day.

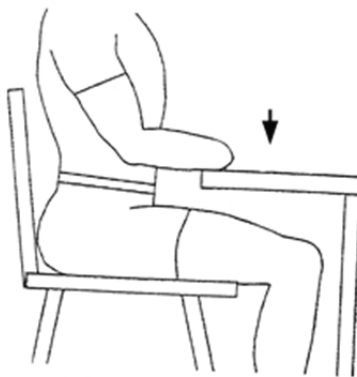


Fig. 12

Elbow Flexion (Fig. 13)

Sit at a table and place your residual limb under it with your elbow bent so that your thumb would face up.

Push up against the table and hold for 10 seconds.

Relax.

Repeat _____ times _____ per day.



Fig. 13

Wrist Flexion/Extension (Fig. 14)

Hold your residual limb with your other hand. Keep your elbow bent at a 90° angle.

Try to lift your wrist up and hold for 10 seconds.

Relax.

Try to bend your wrist down and hold for 10 seconds.

Relax.

Repeat _____ times _____ per day.



Fig. 14

TERMS RELATED TO LIMB LOSS

Lower Extremity

- **Socket** – The hard part of the prosthesis that holds your residual limb.
- **Liner**- a protective layer used between the limb and the prosthesis. Alpha/Tec/IceRoss liners are specialized liners that help prevent complications of fragile skin.
- **Locking pin** - a pin at the end of the liner that locks the prosthesis into place.
- **Neoprene sleeve** - an elastic material that is pulled over the prosthesis to secure the prosthesis to your leg.
- **Silesian belt** (for persons with above knee amputations) - a belt that is worn around your waist to hold the prosthesis in place.
- **Stubbies** (for persons with bilateral above knees amputations) - two very short prostheses without knee joints. They can be used for primary mobility or to practice for prostheses with joints.

Upper Extremity

- **Socket** – The hard part of the prosthesis that holds your residual limb.
- **Liner**- a protective layer used between the limb and the prosthesis. Alpha/Tec/IceRoss liners are specialized liners made with soft rubber that help prevent complications of fragile skin.
- **Figure 8 harness** (for a person with an upper extremity amputation)- type of harness that is worn over the shoulders and back to secure the prosthesis and resembles a figure “8”.
- **Terminal device** (for a person with an upper extremity amputation)- the “hook” or other device that is attached to the wrist and used for functional tasks. There are many choices depending on your lifestyle.

Other terms

- **Pre-prosthetic training**- Physical or occupational therapy PRIOR to getting a prosthesis
- **Residual limb**- the part of your limb that remains after your amputation
- **Ace wrap**- the elasticized wrap to help reduce swelling

- **Shrinker**- the elasticized sock that is used to help reduce swelling
- **Contracture**-a limitation of movement in a joint due to a tight muscle
- **Prosthetic training**- physical or occupational therapy AFTER you get a prosthesis
- **Prosthesis**- artificial limb
- **Prosthetist**- a person who makes artificial limbs
- **Components**- parts that make up your prosthesis
- **Donning**- to put on your prosthesis
- **Doffing**- to take off your prosthesis
- **Stump sock or residual limb sock**- fabric sock used to take up room due to a volume reduction under the socket
- **Socket**- the hard receptacle where the residual limb goes
- **Ply**- sock thickness
- **Congenital**- born with
- **PPAM**- a therapy training device for lower extremity amputations

LEVELS OF AMPUTATION

Upper Extremity Levels

- Forequarter-part of the shoulder girdle and arm
- Shoulder disarticulation- at the shoulder joint
- Above elbow (A/E)- between the shoulder and elbow
- Below elbow (B/E)- between the elbow and wrist
- Wrist disarticulation- at the wrist joint
- Partial hand- any part of the hand

Lower Extremity Levels

- Hemipelvectomy- part of the pelvis and leg
- Hip disarticulation- at the hip joint
- Above knee (A/K, AKA) or transfemoral (TFA)- between the hip and knee
- Knee disarticulation- at the knee joint
- Below knee (B/K, BKA) or transtibial (TTA)- between the knee and ankle
- Symes- at the ankle joint
- Partial foot- below the ankle

Appendix A: DASH diet

FOOD GROUP	DAILY SERVINGS		SERVING SIZES	EXAMPLES*
	1600 kcal kcal	2000 kcal		
Grains & grain products	6	7-8	1 oz dry cereal 1/2 cup cooked pasta, rice, or cereal	Whole wheat bread, oatmeal, crackers, rice, grits, bagel, popcorn, and unsalted pretzels
Fruits	4	4-5	1 medium fruit 1/2 cup fresh, canned, or frozen fruit 3/4 cup fruit juice	Bananas, grapes, apples, oranges, strawberries, watermelon, tangerines, nectarines, melon, and peaches
Vegetables	34	4.5	3/4 cup vegetable juice 1 cup raw vegetables 1/2 cup cooked vegetables	Potatoes, tomatoes, carrots, green beans, squash, lima beans, broccoli, spinach, eggplant, and peas
Low-Fat or fat free dairy	2-3	2-3	1 1/4 oz cheese 1 cup yogurt 1 cup milk	Skim or low-fat milk, fat free or low-fat cheese, fat-free or low-fat yogurt (can even be frozen!)
Meat) poultry, and fish	1-2	2 or less	3 oz** cooked meats, poultry, or fish	Baked, broiled, roasted or grilled meats, poultry, or fish
Fats & oils	2	2-3	1 tsp margarine 2 Tbsp low-fat dressing 1 Tbsp low-fat mayonnaise	Soft margarine, light salad dressing, vegetable oil
Seeds, nuts, and dry beans	3 per week	4-5 per week	1/3 cup nuts 2 Tbsp seeds 1/2 uncooked dry beans	Unsalted peanuts, almonds) walnuts, sunflower seeds, and kidney beans
Sweets	0	5 per week	8 oz lemonade 1 tbsp sugar 1 Tbsp honey	Sugar, jelly beans, jelly, jam, hard candy, and sorbet

*These are examples. It is assumed fat has NOT been added to these foods; do not limit yourself to just these foods

**3 oz is about the size of a deck of cards

More information on the DASH diet can be found at: <http://dash.bwh.harvard.edu>

Memorial Hermann Hospital System

Kristi King, UTSPH Dietetic Intern March 2003

<p>Breakfast</p> <p>½ Cup Oatmeal 1 mini WW bagel 1 banana 1 cup skim milk 1 Tbsp FE cream cheese 6 oz. apple juice</p>	<p>Lunch</p> <p>3 oz grilled chicken breast 2 slices WW bread 1 slice low fat American cheese Lettuce, tomato 1 Tbsp light mayonnaise 4 baby carrots 1 peach</p>
<p>Dinner</p> <p>¾ cup vegetarian spaghetti sauce 1 cup WW spaghetti 3 Tbsp Parmesan cheese Spinach salad: - 1 cup fresh spinach leaves - ¼ cup fresh carrot, grated - ¼ cup fresh mushrooms, sliced - 2 Tbsp light vinaigrette dressing ½ cup pears</p>	<p>Snack (Anytime)</p> <p>1/3 cup almonds ¼ cup dried apricots 1 cup light fruit-flavored yogurt</p>

Memorial Hermann Nutrition Consultants Sharon Smalling, MPH, RD, LD

Appendix B: Components

Above-knee, transfemoral, AKA

Socket

- Ischial containment (NML)

Suspension

- Suction (seal-in liner)
- Vacuum assist
- Pin Liner
- Lanyard/KISS
- Selesian belt

Knee

- Fluid Controlled
 - Microprocessor
- Mechanical
 - Pneumatic
 - Hydraulic
- Polycentric (4-bar)
- Manual lock
- Stance control (weight activated)
- Single axis (constant friction)

Below knee, transtibial, BKA

Socket

- PTB
- TSB

Suspension

- Straps/Cuffs
- Seal in liner
- Sleeve
- Pin lock with liner

Foot

- SACH
- Single axis
- Flexible Keel
- Multi-axis
- Dynamic response
- Specialty

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