

The Prosthetic Process – A Comprehensive Overview

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First Year / Post-Operative

Prosthetic management is usually initiated within the final weeks of wound healing. Wound healing can take anywhere from 6 to 20 weeks following an amputation. Compression garments and prosthetic liners are used on the residual limb to control the size and shape of the limb and encourage the limb to atrophy in a conical shape suitable for prosthetic fit.

A shrinker is a cloth elastic garment, designed to fit on the remaining limb segment following an amputation. They come in several lengths, widths and styles to fit almost any person. Prior to prosthetic fitting, a shrinker is worn almost 24 hours per day. Compression therapy must be done for a minimum of three weeks prior to being considered for a casting. Once you have had your first prosthetic fitting, you must wear your shrinker whenever a prosthesis is not being worn. Use of a shrinker is recommended until the amputated limb has only minor fluctuations between the evening and morning hours. For some amputees this occurs within 1-2 years following the amputation, but for others it is a lifetime concern.

A liner is a covering of silicone or other gel material made to fit the shape and size of the amputated limb segment. In the post operative phase a gel liner can be used in place of the cloth shrinker. Additionally the liner can be used as a permanent interface between the amputated limb and the prosthetic socket when required.

Preparatory Prosthetic Fitting

Once the wound is completely healed and sufficient compression therapy has been used, an amputated limb segment can be fit for a prosthetic socket. The limb segment is copied using plaster or is scanned electronically. The replica of the limb segment is created and modified in preparation to form a shell over top of the model, which will eventually become the prosthetic socket.

A preparatory prosthetic socket is usually made from a thermo formable plastic that can be adjusted to fine tune the fit of the interface to the wearer. Once a comfortable prosthetic socket is made it serves as the attachment point for componentry necessary to make the prosthesis functional and complete. A prosthesis requires a series of adjustments to align the device to the individual user as well as ensure that basic functions can be performed easily. A sufficient training period allows the amputee user and the prosthetist to customize the device to suit the wearer so they meet their individual rehabilitation goals.

It is during this period that the amputee will require prosthetic soft goods. Soft goods describe a wide variety of items that are used with a prosthesis. Included under this category would be prosthetic socks and sheaths, liners, suspension systems and cosmetic coverings.

Socks and sheaths are often needed to protect the amputated limb in the socket, as are liners. Liners are in a sense silicone or gel impregnated socks or coverings applied to the amputated limb to protect and provide comfort to the wearer. Socks and liners are worn over the limb to protect it. They are synthetic interfaces, which absorb the mechanical wear between the skin and the forces exerted by the walls of the prosthetic socket.

Suspending a prosthesis on the body can be achieved using a variety of methods. Special garments and “harnesses” are used to hold and or seal the prosthesis to the limb. Several materials are used from elastic

cloth to synthetic materials such as silicone and urethane. Such garments must maintain suspension of the prosthesis yet be flexible and light as to not impede the users` range of motion.

The Preparatory Prosthesis Completed

Thus far the amputee / client has received the following prosthetic management and care:

- Post operative compression garment fitting
- One functional preparatory prosthetic socket
- All necessary components to complete the preparatory prosthesis
- All necessary soft goods to allow wear and use of the preparatory prosthesis

An amputee wears the preparatory prosthesis in order to help them adjust to using a prosthetic device on a full time basis. After a sufficient period of time has passed (10 to 14 days) and the prosthetic wearer is free of sores or pain the prosthetic socket can be finalized and a permanent socket can be fabricated.

Permanent Prostheses

A permanent prosthesis consists of a laminated composite socket assembled with whatever components have been selected for the patient. Once all of the final adjustments are made, the patient has the option of adding a cosmetic covering to the device to give the prosthesis a more natural look.

Keep in mind that the prosthetic socket is a static shape that is captured the day it is casted or measured for, therefore is unchanging. The amputated limb on the other hand is living tissue, dynamic in nature and subject to change regularly day-to-day, week-to-week and month-to-month. These changes in the amputated limb can be influenced by weight gain, sickness, trauma and numerous other factors.

Additionally, as prosthetic use increases the amputated limb continues to undergo atrophy, volume changes, volume fluctuations and shape changes. The prosthetic wearer may experience occasional skin break down and sores associated with either the pressures related to the changes in the amputated limb to that of the socket or possibly due to the suspension systems or soft goods.

Prostheses are mechanical devices prone to mechanical wear and breakdown, as are any other pieces of machinery or hardware. Maintenance and repairs are typically required over the life of a permanent prosthesis, which can range from two to five years. Accessories used with a prosthesis such as socks and liners require replacement within a few months to about a year.

When Should a Prosthesis Be Replaced?

Socket replacement is required when the permanent socket is:

- No longer adjustable to maintain the wearers comfort
- Significantly larger than the amputated limb, where multiple socks are needed to maintain the intimacy of fit
- Damaged beyond the prosthetist`s ability to repair it or ensure the safety of the wearer

Component replacement is required when the component is:

- Damaged beyond repair
- Worn out to the point where it is altering the function or use of the overall device
- Impeding the function of the device or the wearer

Soft goods and prosthetic accessories require replacement when they are:

- Damaged beyond repair
- Worn out
- No longer fit the client
- No longer appropriate in use with the overall device

Each new prosthesis that is fit and fabricated must follow the steps that are described above. A diagnostic or preparatory device should always be fit initially to ensure that the permanent device will meet the wearer's needs in the years that follow.

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