Choosing an Artificial Limb

The Process of Being Fitted

Once your residual limb is healed and the swelling has reduced, you will be ready for your first fitting for an artificial limb. This is usually about one to two months following surgery, but underlying medical conditions such as vascular disease or an infection might extend this time period.

During a fitting, your Prosthetist will examine your residual limb closely. It is a very personal experience and it can take some time to feel at ease with the process. When going for your first fitting, wearing a t-shirt will make fitting easier if you are an arm amputee. If you are a leg amputee, it is a good idea to wear shorts as well as a comfortable shoe and bring both shoes with you so you can try it on the foot of your artificial limb.

The first step of making your prosthesis is to create a mould; this usually starts with a plaster cast being taken of your residual limb. Generally, the Prosthetist uses a "hands-on" method, as he/she manually checks the residual limb for shapes, which may need special consideration during the fitting process. However, some Prosthetists use "CAD-CAM," a computer-aided design method, where they enter your measurements into a computer and then a milling machine carves out a reproduction of your residual limb. The finished product in both cases is the mould, which is used to fashion a socket to custom-fit your residual limb. Prosthetist may use a "check socket"; a test socket often made of clear material, to visually inspect the fit. Stump socks and liners can help provide proper padding and comfort within the socket.

The most important considerations during a fitting are that the socket fits properly and that the artificial limb is aligned well with the rest of the body. Your feedback to the Prosthetist is needed to help him/her provide the best fitting for you. For example, be sure to tell the Prosthetist if your residual limb is slipping up and down (an action known as pistoning) inside the socket, or if your artificial limb "feels" too long, or too short.

Your First Limb

Depending on your situation, you may be fitted with a temporary limb early on. Before a fitting is considered, your clinical team will want to ensure that your residual limb has completely healed. As the name suggests, the temporary limb is a short term item that is worn while the residual limb continues to gradually change shape. The temporary limb allows you to improve your balance and, if you are a leg amputee, learn how to walk. The Prosthetist will make adjustments to the temporary prosthesis if necessary.

A leg amputee may often have a metal pylon (a rigid central shaft) attached to a basic prosthetic foot as a temporary limb. An arm amputee may be fitted with a passive prosthesis as a first limb - one that has no grip function but which helps with balance and gets you used to the weight of wearing an artificial arm - you may be fitted later with a more functional prosthesis or may decide to stay with the passive prosthesis.

Wearing the temporary limb for short periods everyday will allow your body to adjust; you can then gradually increase the time until you are able to wear it comfortably all day. Physiotherapy exercises will help strengthen your residual limb and allow you to wear the artificial limb for longer periods.

A definitive or permanent limb can be fitted once the residual limb has stabilised and you are comfortable wearing the temporary prosthesis. Your definitive prosthesis is customised to your body and is made for long-term use. Usually, it will last about three years or so for an adult amputee. A child amputee may need a new limb once a year or even more often during growth spurts. Some amputees have a spare limb to use when their definitive limb is being repaired or a new limb is being made.

Things to Consider

There are many different components and prostheses available and a detailed discussion with your Prosthetist will help you make the right choices. Factors to consider include your level of activity, health, level of amputation(s) and the importance of its cosmetic look versus the functionality of the prosthesis.

Artificial limbs have progressed a long way from the early wooden and aluminium versions used after the First and Second World Wars. New technology is making artificial limbs more cosmetically appealing and functional. Artificial legs are very useful for providing mobility and stability, and artificial arms can help with many daily household activities. There are many specific types of prostheses, including special limbs or devices for certain tasks and activities which makes it very important to discuss your expectations and requirements with your Prosthetist.

To make the best use of the time during your appointments with your Prosthetist, it is a good idea to write down any questions you can think of in advance as you do not want to forget anything. Taking notes during these meetings so that you can refer back to them later is also helpful: with so much information coming your way, these notes can be reviewed later when you have more time.

Arm amputee

If you are an arm amputee, your choices range from a passive to a more functional prosthesis. Passive arms have no grasping function but have a good cosmetic appearance. Functional arms can either be body-powered or electric (most often myoelectric). Cable-operated hands and hooks are known as "body-powered" prostheses and are operated by the use of a cable and harness system. By using the back and shoulder muscles, the cable is pulled which either opens ("voluntary opening") or closes ("voluntary closing") the hand.

A "myoelectric" prosthesis is operated when the electrodes pick up muscle impulses from your residual limb. These are then translated into electrical signals that are sent to the electric hand to open or close it. A battery in the prosthesis provides the power. Although less common than myoelectric arms, there are also electric arms that are operated by other means, like a switch that you can turn on and off. Some types of arms have the option of either being myoelectrically controlled or switch-controlled.

Leg amputee

If you are a leg amputee, you will be fitted with one of two types of limb. An exoskeletal prosthesis has a hard outer shell made primarily of plastics and laminates. An endoskeletal, or modular prosthesis, has a tube or pylon frame that acts as a type of "skeleton." A soft foam cover is usually applied over the prosthesis, which is shaped to match the missing limb.

There are many pros and cons for different types of artificial limbs and you should discuss which characteristics are the most important for you with your Prosthetist.

Some of the considerations are:

1. Your Level of Activity

Artificial limbs are designed for low, medium and high-level activities. Usually low-activity limbs are simpler in design and may be lighter in weight than high-activity ones, which may contain more complex components. Endoskeletal components are lightweight, require few adjustments, and have parts that are easily interchanged. Exoskeletal components are durable, last longer and can endure strenuous wear.

2. Your Health

Amputees with an active lifestyle may require limbs with more advanced function (though there might be extra maintenance involved). Sometimes, less active amputees and those who have conditions like diabetes or vascular disease, choose to use simple artificial limbs that are comfortable, easy to use, light and/or require less energy to use. For example, a "slide-on socket" which is easy to slip on with a lightweight activity belt could be useful if you are a senior amputee. Stance control safety knees are useful for leg amputees with limited muscle control since they contain a weight-activated safety brake.

3. Your Level of Amputation

Leg amputees will need to consider the type of foot that is suitable for them. For instance, a partial foot amputee can use a shoe filler for better function. Some leg amputees will consider an articulated ankle (with jointed parts that move) and an above-knee amputee will also consider the type of knee joint they require.

Similarly, partial hand amputees might be interested in an opposition post (a device that allows partial hand amputees to grasp while retaining sensation). Arm amputees will consider the type of terminal device they will use for hand function as well as possibly a wrist joint. Above-elbow amputees will also consider the type of elbow joint. Hybrid fittings that incorporate at least two different features - such as a body-powered and myoelectric hybrid arm combining an electric hand and a cable-operated elbow - are common in above-elbow fittings.

The weight of each component becomes an important consideration for high-level amputees. Most bilateral and multiple amputees can be fitted with artificial limbs, but sometimes other

mobility aids like a wheelchair are also useful. Some amputees who use prostheses for certain activities rely on their wheelchair for activities involving long distances.

4. Cosmetic Look versus Functionality

There is sometimes a trade-off between the cosmetic look (cosmesis) of an artificial limb and its function. If you are a leg amputee, for example, highly cosmetic coverings are expensive and may be easily damaged if you lead a very active lifestyle. If you are an arm amputee, hooks are very functional because of their good pinch and grasp function, but do not look as natural as a passive or myoelectric hand. You have to find the right balance of cosmesis and function to suit your needs.

5. Other Options

In addition to the standard limb, you should consider whether you need additional specialised limbs. Many amputees have different artificial limbs for specific activities. A Prosthetist can make a recreational arm or leg specially designed for sports, such as skiing or swimming. Specific devices, like a simple ring attached to the handlebars of a bicycle for upper-limb amputees, can also be made. Remember, the Prosthetist is an expert on artificial limbs, but you are an expert on yourself and what you need!