

A Step Ahead

Capitol Orthopedic Prosthetic Newsletter

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Suspension 101 (Part 2)

Arguably the most popular form of suspension for the above the knee amputee is suction suspension. The premise for suction suspension is that the volume of the socket is slightly less than the volume of the residual limb. The tension created inside the socket holds the prosthesis on the amputee. A one-way valve is used to



Courtesy of
Ossur

let air out of the socket when necessary or to release the "suction" when the patient wants to remove the prosthesis. A new variation to this method is shown in the picture to the left. The liner that is shown is rolled on the residual limb and the seal at the bottom third of the liner creates a "vacuum" in the socket which

holds the prosthesis in place. The advantage to this suspension is a very intimate fit and increased proprioception for the patient. The drawback is that variation in limb volume can change the quality of the suspension.

The option which is often used for new amputees and for pediatric amputees, is the silesian belt. This is a belt that goes over the socket and around the waist of the amputee and holds the prosthesis on the amputee. The belt may either be made of a rigid or soft material depending on the application desired. The drawback to this method is the amount of pistoning that occurs in the socket. The advantage is that the suspension is not necessarily affected by changes in the volume of the residual limb. Adjustments to volume changes are made by using prosthetic socks.

A third option which may be used is the use of a lock. As with the below the knee amputee, a silicone liner is rolled onto the patient's residual limb. This liner has an attachment on the end which is inserted into a lock mechanism in the socket. This lock and liner combination hold the prosthesis on the patient. The patient must have a limb which is short enough to accommodate the lock between the end of the residual limb and the prosthetic knee. In most cases, donning the prosthesis is fairly easy and volume changes can be accommodated with socks. A variant to this is the use of a lanyard. The principle is the same, the lanyard is attached to the liner and then is attached to the socket. This method requires slightly less room than if a lock is used. The drawback to this system is the need for extra space between the residual limb and knee unit. Also the patient must know for sure that the pin is engaged with the lock prior to trying to walk.

Looking into the future, an option that is being explored is osseointervation. In this method, a titanium rod is inserted in the femur and extends through the skin of the residual limb. This rod serves as an attachment point for the prosthetic components. This method is currently being tested in Europe and its use is not widespread.

No matter which choice is made, poor suspension will result in poor gait and increase the likelihood of skin and comfort problems. Proper suspension will give the patient increased comfort, feeling of security and better proprioception.

LOREN'S LINES

I APPRECIATE THE FEEDBACK AND INPUT I HAVE BEEN GETTING IN RESPONSE TO THE NEWSLETTER. IT HELPS WITH WHAT TOPICS TO DISCUSS AND IN ANSWERING QUESTIONS THAT YOU MAY HAVE. I HOPE IN THE COMING ISSUES TO COVER MORE OF THE TOPICS THAT HAVE BEEN BROUGHT UP AND WELCOME ADDITIONAL IDEAS.

I WOULD ALSO LIKE TO SAY THANK YOU FOR TRUSTING ME WITH THE PATIENTS THAT YOU HAVE REFERRED. AS YOU WELL KNOW, REFERRALS ARE EXTREMELY IMPORTANT TO THE SUCCESS OF A PRACTICE. I TAKE THE TREATMENT OF PATIENTS THAT YOU SEND ME SERIOUSLY AND MAKE EVERY EFFORT POSSIBLE TO PROVIDE THE HIGHEST QUALITY OF CARE.

AS ALWAYS, IF YOU HAVE ANY QUESTIONS OR THERE IS ANY WAY I CAN HELP, PLEASE CALL ANYTIME.

LOREN

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Skin Care for Amputees

For amputees, proper skin care is critical. The skin of the residual limb is captured in a socket that does not allow air to circulate around the skin. This warm moist environment creates the potential for fungus and or bacteria to grow. The need for an intimate fitting socket also creates potential for skin problems.

The three main contributing factors to skin problems for the amputee are too much pressure in one or more areas, not enough pressure in an area, usually the distal end of the residual limb, and improper care of the limb or the inside the socket by the patient.

If the socket is not fitting correctly

or is not in correct alignment, too much pressure can be placed in one location on the limb. This will result in the skin breaking down in that spot. This can happen if the patient has significant weight loss or gain, the improper amount of socks are being worn, or the socket is ill fitting.

In most socket styles, slight pressure is desired over the entire residual limb. More in some area, less in other areas. Not having enough pressure can allow fluid to pool in one location and cause blistering and other breakdown issues. Long term lack of pressure may result in verrucose hyperplasia. This usually occurs at the distal end of the limb.

The practitioner is responsible for the socket fit but the patient is re-

sponsible for practicing proper hygiene. This is probably the most critical part of reducing skin issues. Whether the patient uses a silicone liner or socks and foam liner, they must clean the items daily. The best results occur when the patient uses warm water and mild soap with no scent. On occasion it may even be necessary to clean the silicone or foam liner with diluted alcohol. Socks should be laundered after one use per the package instructions. They should never be worn a second time without cleaning.

If these general guidelines are followed the patient will be able to spend more time wearing the prosthesis and less time away from work or not being able to perform their activities of daily living.