LimbLogic VS

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When working with prosthetic limbs it is extremely important to fit the prosthesis as closely to the limb as possible to prevent skin irritations or pain. Most often a pin locking system is used, but there are some complications that arise with this technique. Some clinicians question its use because of the observed daily and chronic changes to the limb. However, a new suspension system involving suction is proving to be much more beneficial to the patient.

This new attachment system is called the LimbLogic VS manufactured by the prosthetic supply company Ohio Willow Wood. It uses vacuum suspension which has proven to be a major innovation since its creation in 1999. This connection is unique in that it alters the pressure that the limb experiences, making it better than any other system available today. It prevents volume loss in the limb throughout the day that makes wearing the prosthesis uncomfortable and loose as the day progresses. Using the suction system rather than the pin lock system also makes the prosthesis feel lighter to the patient because the connection between the two is so much stronger.

The vacuum system itself includes a pump that removes air molecules from the sealed air space between the socket and the liner. The vacuum formed by the removal of the air pocket holds the liner securely to the socket wall. One benefit to this system is that the skin and liner are no longer able to separate from the socket, therefore improving limb health. It would take an extraction force of about 70kg to cause any kind of separation between the limb and the socket. Since everyday extraction forces rarely exceeds 5 to10kg, there is little chance the connection would be jeopardized. In contrast, in other types of suspension, the liner separates as soon as a tiny extraction force is applied (<0.25kg).

The elimination of this separation has a variety of benefits for the patient. For instance the secure connection improves the wearer's spacial awareness and control over the leg. New users of the vacuum system are surprised at how closely the prosthesis feels like part of their own limb. The leg is also more responsive; when the person moves their own limb the prosthesis immediately follows. The LimbLogic VS is also now completely waterproof for freshwater, so amputees can feel more comfortable swimming with their artificial leg.

The first amputees to use this system in 1999 found that their limb did not lose volume throughout the day, which they found to be a major advantage over previous connections. Volume is typically lost because of elevated pressure, due from walking or standing, increases the amount of interstitial fluid being pushed back into the blood stream and out of the leg. However volume increases when the soft tissues elongate during swing and the fluid is drawn out of the blood stream and back into the limb. The vacuum system prevents these daily volume fluctuations because of three reasons. One being that less fluid is taken out of the leg due to the drop in positive pressure while standing. Secondly, more fluid is brought into the leg while in swing because of the decrease in pressure. And lastly, it could be a combination of the two.

Ohio Willow Wood launched this system for commercial use in September of 2007 and was met with an overwhelming positive response from practitioners and their patients. Due to such a peak in interest they have sold all manufactured LimbLogic VS and are now on back order. The company also offers education and demonstration classes for both practitioners and technicians to help spread the word of this new technology. It has proven to be the most beneficial limb connection unit available for prostheses to date.

Sources:

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