

Suction (liner)



Description

This suspension system replaces the skin suction system by using a valve and a silicon or gel liner between the residual limb and the socket.

The liner will have one or more sealing rings, ribs or membranes. The amputee first dons the liner then slides it into the socket. When in place, the liner's seals flatten against the socket wall and provide an air tight seal.

An expulsion valve is used to remove air from the end of the socket as the liner is slid into place, sealing the system once the valve is closed.

The nature of the seals requires use of a temporary lubricant to aid the seals sliding into place. Once sealed, the system generates powerful suspension.

The system is used extensively in transfemoral and transtibial prostheses. Transtibial amputees do not need to wear an external sleeve to create an effective suspension.

To remove the prosthesis, the user releases the suction valve, allowing air to return to the distal socket. This allows the seal to be broken and the prosthesis can be removed.

Where the seals do not occur, the liner is often covered with a textile to extend durability.

Advantages

- Comfortable – the even pressure distribution reduces uncomfortable pressure peaks
- Very secure
- Durable
- Reliable
- Can be donned from a seated position
- Allows for minor volume fluctuations
- Enhanced stabilization of the tissues
- Seals may be height adjustable
- Transtibial amputees need not wear an external sleeve to create a solid suspension

Disadvantages

- Relatively expensive
- Heavier than some other types of suspension
- Liners wear and require replacement
- Significant volume fluctuations may cause the seal to fail
- Strength requirement for donning liner
- A sub-optimal fit may cause the socket to rotate
- Lubricant is required to aid donning