

Above Knee Prosthesis

Skin Suction Suspension

General Description:

There are many types of above knee (AK) prostheses. The type that an amputee is fit with depends on the shape of the residual limb, the length of the residual limb, activity level, prognosis, and individual preference.

An above knee amputee is unable to bear weight on the bottom of his residual limb. In order to keep the weight off the bottom of the limb, the amputee must support his body weight on either the ischial tuberosity (seat bone), the soft tissue of the limb, the gluteal tissues or a combination of the three. In order to hold the prosthesis onto the person's body, a method of suspension must be used.

Skin suction suspension is when the residual limb is pulled into the socket with a pull sock or a donning sleeve through a hole in the bottom of the socket. The socket is actually smaller than the limb and as the patient pulls his tissue into the socket, a negative pressure develops between the socket and the limb. A valve is then inserted into the hole and vacuum is achieved. Suction suspension is one of the best forms of suspension. The prosthesis feels lighter to the wearer because it is always with them with no possibility of pistoning or movement within the socket. The biggest disadvantage of suction suspension is that the limb must be volumetrically stable. If the wearer gains weight he will no longer be able to get into the prosthesis and if he loses weight, suction will be lost and the prosthesis will not stay on. A person using suction suspension must also have adequate arm and hand strength and balance in order to pull the limb into the prosthesis.



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Application and Removal:

There are three ways to apply or don a skin suction socket: pull sock, ace bandage, or a donning sleeve.

1. **Pull sock:** Use a cotton tubular pull sock that is two to three times the length of the residual limb. Pull the sock over the limb all the way up to the groin area. A long length of sock will be remaining at the end of the limb. Push the remainder of the sock through the valve hole at the bottom of the prosthetic socket while pushing the residual limb into the socket. Begin pulling the end of the sock through the valve hole. The wearer must alternate between lifting up and pushing down while pulling the sock through the valve hole. Gradually, the pull sock will have pulled all the way through the valve hole and the residual limb will be all the way into the socket. While keeping weight on the prosthesis, the valve is then inserted into the valve housing.
2. **Ace Bandage:** Use a 4"x 5' ace bandage. Start wrapping the bandage from the top of the residual limb using moderate pressure and overlapping approximately half of the preceding wrap. After wrapping the entire limb, a length of ace bandage will be remaining at the bottom of the limb. Push the remainder of the bandage through the valve hole at the bottom of the prosthetic socket while pushing the residual limb into the socket. Begin pulling the end of the bandage through the valve hole. The wearer must alternate between lifting up and pushing down while pulling the bandage through the valve hole. Gradually, the bandage will have pulled all the way through the valve hole and the residual limb will be all the way into the socket. While keeping weight on the prosthesis, the valve is then inserted into the valve housing.
3. **Donning Sleeve:** This is a cone shaped sleeve made out of a slippery material that is similar to parachute material. Insert the residual limb into the sleeve up to the groin area. Pull the tail of the sleeve through the valve hole in the bottom of the socket while pushing the residual limb into the socket. Begin pulling the end of the tail through the valve hole. The wearer must alternate between lifting up and pushing down while pulling the sleeve through the valve hole. Gradually, the sleeve will pull completely through the valve hole and the residual limb will be all the way into the socket. While keeping weight on the prosthesis, the valve is then inserted into the valve housing.

To remove the prosthesis, the wearer must either push the button on the suction valve or unscrew the valve completely to release the vacuum and push the socket off of the residual limb.

Care and Maintenance:

The prosthetic socket should be cleaned daily with mild soap (no perfumes, lotions, or deodorants) and water. Depending on the skin sensitivity of the wearer, alcohol or moist towelettes may also be used. The valve may also need periodic cleaning. Ask a prosthetist how to dismantle and clean the valve or see a prosthetist for periodic valve cleaning.

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Tips and Problem Solving:

If the prosthesis no longer achieves suction:

- There may be a leak in the valve. See a prosthetist for evaluation.
- Weight change may have caused a decrease in volume. The prosthetist should be seen for possible padding of the socket.

If the bottom of the residual limb is purplish in color or swollen:

- Weight gain or volume fluctuation may be preventing the residual limb from going all of the way into the socket. See a prosthetist for evaluation.

For further troubleshooting, see [AK Troubleshooting](#).

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