

# How to Do Ply Reductions Using Vacuum



■ By Jason Kimmel

**Learning how other technicians fabricate** is always exciting. You get to see their tricks-of-the-trade and apply them to your own fabrication techniques. The best tricks offer a simple solution to speed up a common and tedious process—like the never-ending need for ply reductions to sockets. Most technicians employ one of two methods to grapple with ply reductions:

1. **Modify by hand.** Sand the plaster mold and check your progress with a tape measure en route to a new circumference every two inches. The job easily can take an hour or more and really is not time efficient.
2. **Glue a ply sock inside the socket before making a new plaster model.** After the plaster cures, rip the sock off the dried plaster. This always leaves a coating of lint, and you still have to smooth the plaster, which takes an undesirable amount of time.

Both of these methods seem like a little too much work. After using the hand modification method for years here at Otto Bock, we switched to gluing a ply sock in the socket. The downside of this method was the residual lint. To cut down on smoothing time, we started looking for a way to place some type of barrier between the sock and the plaster.

One of the options we experimented with was an isolation rubber. While it easily peels off cured plaster, we could not get it

to form to the socket. Eventually, we tried using vacuum. When we turned on the vacuum and the isolation rubber hugged the contours of the socket, we knew we had found the winning combination for a fast and easy technique to globally reduce a socket.

For the past few years, we've been using vacuum-on-ply reductions for almost all amputation levels—above the knee, below the knee, and for upper limb. This method results in a uniform reduction and nearly effortless smoothing of the plaster.

Better still, the vacuum technique offers the ability to provide relief areas where needed, such as the fibula head or distal tibia, simply by cutting holes in the ply sock. You can also vary the reduction at any given level by cutting the length of the sock.

Because the residual limb tends to shrink or change over time, technicians frequently receive ply reduction requests. We've had requests for reductions ranging from one-ply to 20-ply, and with the vacuum technique, we're able to make precise modifications to an existing socket.

This technique works particularly well with total-surface weight bearing sockets. When you're dealing with a uniform-pressure socket that requires a ply reduction, the ability to take off the exact amount of ply requested produces a perfectly reduced socket. Here's how we do it:

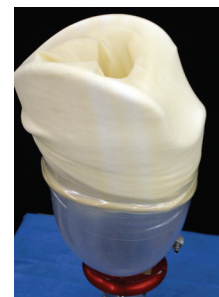
## Ply Reduction Technique

- **Install a barb fitting on the socket.** Drill, tap, and install a barb fitting a few inches above the bottom of the socket. Apply epoxy around the threads to secure the fitting in place and create a seal.
- **Insert a ply sock into the socket.** Select a ply sock equal to the ply reduction the practitioner specifies. Insert the sock only far enough for the sock to reach the bottom of the socket. Too much sock can cause wrinkles. Tape the sock in place on the outside of the socket.

If the patient has pressure-sensitive areas where no reduction is required, use a blade to cut holes in the sock to create relief.



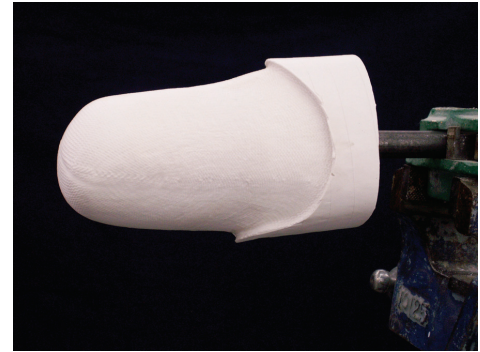
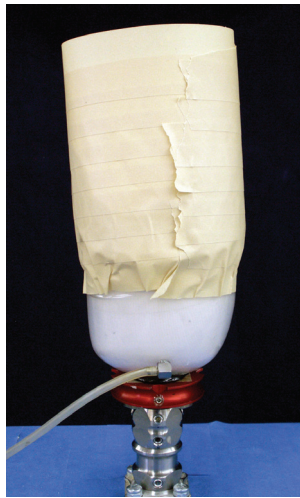
- Wherever you make holes, there will be no reduction.
- **Insert an isolation rubber into the socket.** Lower the rubber into the socket. Then stretch the top over the edges of the socket, extending it over the trim lines and against the outside walls of the socket. Securely tape the isolation rubber to the socket to ensure a seal.
- **Apply vacuum.** Attach a vacuum hose to the barb fitting and apply vacuum. Make sure the ply sock is vacuum-formed to the inside walls of the socket and has seated properly at the distal end. Work out any wrinkles on the inside of the socket and around the trim lines.



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Some of our technicians have found that repeatedly turning the vacuum off and on while massaging the sock helps tame the most stubborn wrinkles.

- **Prepare for a plaster fill.** We like to use masking tape to create a dam extending at least one inch beyond the top of the socket. Fill the socket with plaster and insert a pipe.
- **Remove the socket, ply sock, and isolation rubber.** After the plaster has cured, remove the socket. Pull the ply sock off the isolation rubber. Anyone who has tried to free a sock stuck on plaster will laugh at how easy the sock comes off. Pull off the isolation rubber, exposing a lint-free plaster model.
- **Smooth the plaster.** Clamp the pipe in a vice. Use a sanding screen and smooth just enough to remove the texture of the sock. You are now ready to fabricate the reduced socket.



With the use of vacuum, you'll soon be doing ply reductions with greater ease and precision, and without any fuzz. **O&P EDGE**

*Jason Kimmel is lead fabrication prosthetic technician for Otto Bock US HealthCare. He oversees all prosthetic fabrication and is the main prosthetic contact at the Otto Bock Technical Center in Minneapolis, Minnesota.*

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