Hollow Exoskeletal Fabrication Instructions

Slides by Darren Vincent can be viewed at this link

1. Duplicate alignment of prosthesis which patient uses for walking.
   Duplicate in vertical alignment fixture or equivalent.
2. Prepare cast for laminated socket.
3. Pull one layer of 1/2 ounce felt over model. (optional)
4. Pull one layer of nyglass over the felt (optional).
5. Measure the length of the fiberglass stockinette needed (twice the length of the plaster model).
   Pull fiberglass over the model and tie with nylon thread in center and invert the other half over.
6. Pull one final layer of nyglass stockinette over model.
7. Pull a PVA bag over the model. Tape it off below the lower suction hole on the suction pipe.
8. Measure and mix enough resin to laminate the socket (e.g. 200g of resin for medium sized BK).
   For best results, use either epoxy or acrylic resin.
9. Do not remove PVA bag after resin has set. Bag will be separator for A/B foam.
10. Assemble *Activankle*, socket adapter and laminating pyramid as one assembly.
11. Install cast back into vertical alignment fixture.
    Bolt *Activankle* assembly (Step #10) to vertical alignment footplate.
12. Apply release agent to inside of laminating pyramid for removal later on.
13. With model in place and ankle assembly bolted into fixture, wrap 1mm thick polyethylene sheet or x-ray film around model and laminating pyramid. Leave enough room around model to pour A/B foam.
14. Secure polyethylene sheet with tape so as not to leak at bottom around laminating pyramid.
15. Measure and mix enough A/B foam to fill the opening by 1/3 the distance.
16. Pour into space between socket and polyethylene sheet.
17. Remove polyethylene sheet after the foam has set (approximately 30 minutes).
18. Using a rasp, shape the A/B foam according to the patient's measurements.
19. Use micro balloons around sharp edges and to fill any large holes.
20. Smooth foam and micro balloons with Durite. Finish of foam is factor in the overall finish of limb.
21. Remove laminating pyramid from end of foam and smooth edges so they won't harm PVA bag.
22. Pull PVA bag over foam and seal end. Pull PVA far enough to obtain suction.
23. Pull one layer of nyglass stockinette over model.
24. Reinforce the end where the pyramid is going to be placed.
    Use either carbon fiber stockinette or carbon fiber matting.
25. Place pyramid on end.
26. See note at bottom for skier's knee brace attachment plate. (optional)
27. Measure and cut enough fiberglass stockinette needed (twice the length of the model).
    Pull fiberglass over the model, tie around and invert other half over.
28. Measure and cut enough nyglass stockinet to cover model (twice the length is needed).
29. Measure and mix enough resin to laminate the model (use acrylic or epoxy resin).
30. Remove from cast and separate the outer lamination from the inner socket and foam.
    Dispose of foam. Trim and smooth socket.
31. Scuff the outer proximal edges of the inner socket and the inner edges of the hollow limb.
32. Paint a thin coat of resin to the outside edge of the inner socket and install into limb.
    Turn prosthesis upside down until resin hardens.

33. Blend edges of the inner and outer together and smooth.

34. Drill two 3/8" holes in the posterior of prosthesis. Bottom edge of one hole is tangent to top edge o laminating pyramid. Second hole is located at upper end of hollow section, but not so high as to be covered by a suspension sleeve. Be careful not to drill through inner socket. These holes will allow hollow section to fill with water and create a neutral buoyancy when going into the water.

NOTE: *If the leg will be used for skiing, the use of a hard knee brace is recommended. Laminate a stainless steel plate (appox.3/4"x1 1/2"x1/8") with a single threaded hole (1/4" or 6mm is sufficient) into the leg. Placement of the plate will depend on the brace used. (e.g. For a Townsend brace, threaded hole in plate should be approximately 3" or 8cm below patella on tibial centerline. After leg is completed, drill matching hole in brace. For best results use a partially threaded bolt. Cut threaded end so that 1/8" of threads remain. Cut smooth section of bolt so that when the brace is in place, the end of the cut off bolt will be flush with the surface of the brace. A screwdriver slot can be cut into the end of the bolt with a hacksaw for easy install and removal of the bolt.*

These are fabrication guidelines.
Quantity of material used will depend on the patient's weight and activity level.

Rampro can have your Hollow Exoskeletal leg fabricated for you from just a walking alignment.Call Rampro for details, or email Darren Vincent.