

Technical Note: RMB Reinforcement

by Robert O. Gooch, C.P.

Because of the humid climate, the Department of Prosthetics and Orthotics at Duke University Medical Center receives many prescriptions for hard socket below-knee prostheses. The great majority are supracondylar wedge suspension, utilizing the Removable Medial Brim (RMB) concept. For the past several years, we have designed and fitted approximately 150 such prostheses annually.

Based on this experience, we have developed a method to reinforce the RMB structure and prevent gradual loss of alignment under the constant pressure of the femoral condyles. We now use this technique routinely, and find it greatly enhances the stability of the removable brim.

METHOD

Fabricate the socket in the conventional manner, following the instructions supplied by the hardware manufacturer.¹ Rather than packing the mechanism with clay, we prefer to substitute Johnson's Stik-Wax,² which is easier to work with and lubricates the assembly, allowing easier removal. Once the lamination is fully cured, break out the positive model.

At this point, the medial brim is cut away from the socket. Although a variety of tools can be used for this operation, we prefer a simple modification of an ordinary hacksaw blade.

Grind the fine-tooth hacksaw blade into the contour shown in (Figure 1). This is preferable to a commercial sabre saw blade, because its wide, thin shape creates a smoother, less irregular cut.

Using the sabre saw, cut the anterior and posterior portion of the brim free, being careful not to nick the metal upright. Cut the area adjacent to and over the metal upright with a cast saw or sharp knife. Carefully pry the medial brim free with a thin-bladed screwdriver.

Grind the distal end of the upright an amount equal to the saw kerf, to insure the wedge will seat fully (Figure 2). Place the brim back onto the socket to be certain it fits properly, with minimal gapping along the cut edge.

REINFORCEMENT

Remove the brim and apply PVC tape³ to the lateral surface and distal trimline. This serves as a parting agent, and prevents the resin used in subsequent steps from bonding the wedge back onto the socket.

Roughen the socket immediately beneath the cut-line, to insure good adhesion for the reinforcement lip (Figure 3). Lubricate the cut edge with petroleum jelly and reapply the wedge carefully to avoid gapping.

Cut three 1½" wide strips of Xynole-polyester⁴ fabric long enough to cover the saw cut. This material saturates readily when used with polyester resin and forms a thin, strong, and rigid reinforcement.

Promote a small amount of pigmented polyester 4110 (rigid) resin. Paint the roughened area of the socket with resin, and apply one layer of Xynole reinforcement extending at least ½" onto the wedge (Figure 4). Brush additional resin onto the Xynole until it is fully saturated, and apply the second layer. Fully saturate this layer and apply the final layer. Sat-

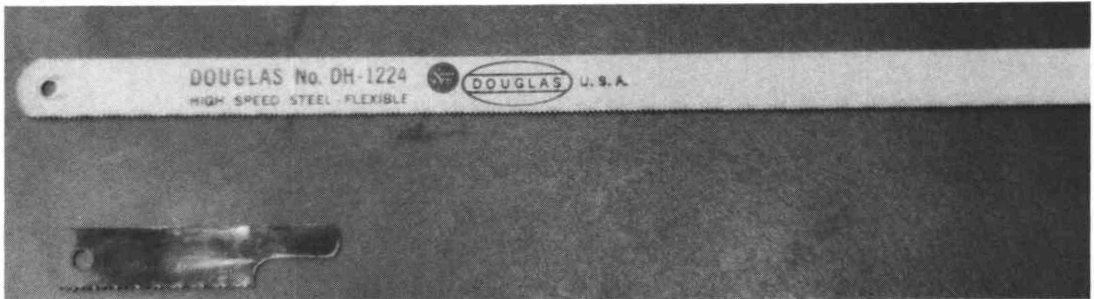


Figure 1. Fine-toothed hacksaw blade, modified to fit sabre saw.

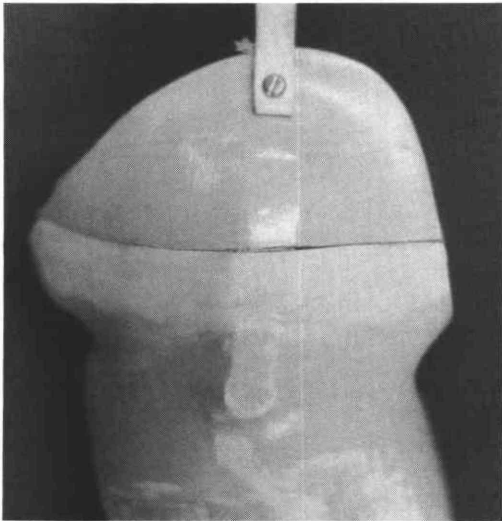


Figure 2. Grind distal upright to insure the wedge fits without gapping.

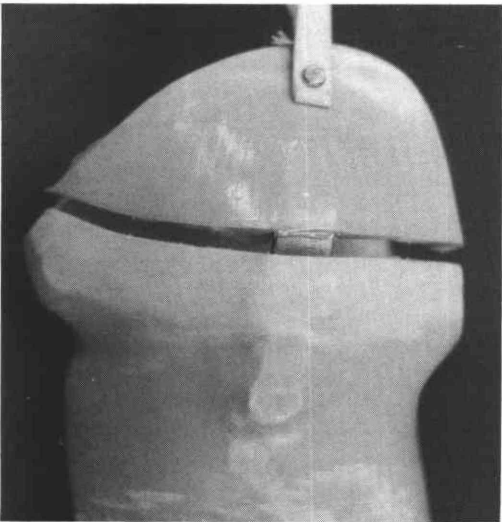


Figure 3. Tape wedge and roughen socket prior to lamination of lip.

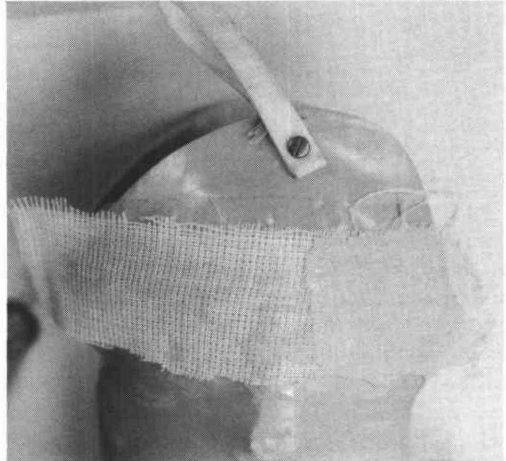


Figure 4. Saturate Xynole layers individually with the polyester resin.

urate this in a similar manner.

When the resin has gelled, but not fully set, remove the wedge. This insures that the wedge will insert smoothly, without binding, in the finished prosthesis.

Once fully cured, trim the reinforcement to form a $\frac{3}{16}$ " lip (Figure 5). Using a felt arbor, bevel the inside edge of the lip and the outside edge of the wedge (Figure 6). This unobtrusive lip will significantly reinforce the wedge, particularly against malrotation.

FINISHING

Once dynamic alignment and transferring are completed, the prosthesis is ready for the finish lamination. We typically set the wedge aside and relaminate the prosthesis without the proximal brim in place.

An old RMB upright can be inserted into the

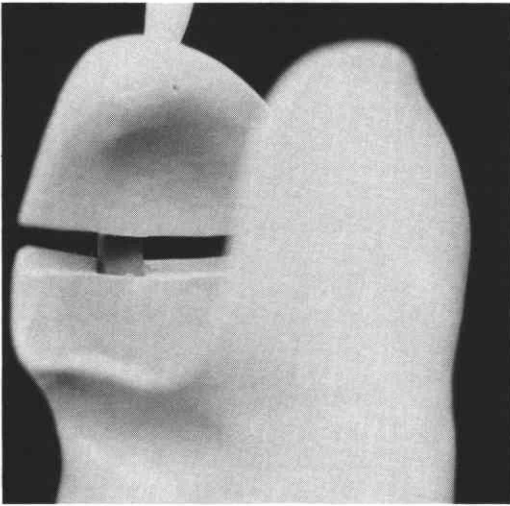


Figure 5. Trim lip to $\frac{3}{16}$ " above socket edge.

channel and clamped in a vise. This prevents resin from filling the channel and provides a mandrel to secure the prosthesis during the lamination procedure. Lubricate the upright with Stik-Wax² to fully seal the channel.

SUMMARY

Fabrication of a Xynole reinforcing lip significantly improves the stability of the supra-condylar wedge when using the Removable Medial Brim procedure. Based on the Duke experience with hundreds of RMB prostheses, we recommend this be done routinely.

AUTHOR

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Figure 6. Posterior view of lip with wedge in place. Note bevel on inner edge of lip and outer edge of wedge.

APPENDIX

- ¹ Durr-Fillauer Medical, Inc.
P.O. Box 5189
Chattanooga, TN 37406
RMB Hardware Kit
Catalog #127019 (Heavy Duty)
Catalog #127001 (Standard Duty)
- ² S.C. Johnson & Sons, Inc.
Racine, WI 53403
#140 Stik-Wax—15 oz. container
- ³ Otto Bock Industries
4130 Highway 55
Minneapolis, MN 55422
Coroplast PVC tape
Catalog #616F8
- ⁴ Durr-Fillauer Medical, Inc.
P.O. Box 5189
Chattanooga, TN 37406
Xynole-Polyester cloth
Catalog #211094