Brief or New: A Gauntlet Work Splint

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Protective splints are often used by patients who have a history of fractures, sprains, or nerve entrapments. These splints are fitted at the patient’s wrist level to provide rest and support to the disturbed structures. Many occupational therapists favor the use of low-temperature thermoplastic materials to fabricate splints that intimately fit the forearm and align the injured wrist during the healing phase. Splints made of this material provide the required anatomical support but fall short with regard to comfort when the performance of light-to-moderate industrial work is desired. Because an earlier return to work is now emphasized in treatment, many patients are required to use a supportive splint for the first few weeks after they return to work. When using traditional low-temperature thermoplastic splints, many patients have reported a lack of durability, an excessive rigidity, and discomfort.

To improve the durability of forearm hand splints, Melvin (1) and the Canadian Arthritis and Rheumatism Society (2) advocate the use of polyethylene material. Polyethylene is a tough, wearable material that (a) can withstand wear and tear, (b) offers the wearer the needed protection, (c) is lightweight, and (d) can be fitted intimately. However, polyethylene requires a higher heating temperature, which prohibits direct fitting over the skin surface. The splint must be formed with negative and positive molds.

Combining Plastazote® (manufactured by Smith & Nephew Ltd., Bessemer Road, Welwyn Garden City, Herts., England) with polyethylene to form a splint for patients with rheumatoid arthritis was first observed in the Occupational Therapy Department at Calgary General Hospital in Calgary, Alberta, Canada (Protocol for the Treatment of Rheumatoid Arthritis, unpublished data). The Plastazote serves as a cushion, and the polyethylene provides the structure for the splint. The insulating properties of Plastazote make it possible to directly form a polyethylene splint on the patient. Plastazote-polyethylene splints have been fitted to many of our wrist-injured patients, and reports have been favorable regarding both the splint’s durability and the patient’s comfort while on the job.

Supplies

- Polyethylene: low density, nonstressed, 0.156 cm thick;
- Plastazote: regular density, pink, 0.32 cm thick, perforated (if unperforated is used, holes can be poked in the material with a tool such as a knitting needle. The perforation facilitates the bonding between the two materials);
- Acrylic or wool gloves with a suede palm (to allow for more definitive splint fitting and to protect the therapist’s hands from the hot polyethylene); and
- Velcro strapping.

Construction

1. Using a gauntlet working splint pattern with width extended to enable a circumferential fit (see Figure 1), outline the pattern on polyethylene using a sharp object and then cut out the piece.
2. After increasing the size of the initial pattern by 2 cm, cut out another piece from the Plastazote. The Plastazote needs to form a “picture frame” around the polyethylene.
3. Before heating, check the splint orientation and review fabrication procedures. It is imperative that the Plastazote, not the polyethylene, touch the skin in the fitting. If the patient has a prominent ulnar styloid, the space al-
lowed for the styloid can be exaggerated by “doming” the area with adhesive-backed lining material or Reston. (Reston, manufactured by 3M, Minneapolis, is an adhesive-backed, 1 cm, low-density foam available in 20 x 30 cm sheets and distributed by medical suppliers.) If the patient is sensitive to heat or if perforations in the Plastazote are such that light is visible through the holes, the patient’s skin should be protected with a stockinette glove. Because the therapist directly handles the polyethylene material, he or she should wear protective acrylic or wool gloves that have a suede palm.

4. The layered splinting material is placed on a talcum-powdered cookie sheet (with the Plastazote piece on the bottom and the polyethylene centered over it) and baked in a preheated oven (225-250 °F) for approximately two minutes until the polyethylene appears “slick” and translucent. Overheating will create bubbles, which cannot always be flattened.

5. Quickly remove the material and fit it to the patient’s hand; working time is approximately 15 to 20 seconds. After the splint cools, only the trim lines, not the structural contour, can be modified.

6. Trim major edges with curved scissors and smooth the edges with a skiving knife.

7. Apply either the self-adhesive hook-type Velcro straps or rivet the straps to the splint surface (see Figures 2 and 3).

Discussion

This splint has been used for a wide spectrum of wrist injuries, trauma, and repetitive motion wrist disorders in the last five years. It has provided patients with both
the anatomical support and the comfort needed for an early return to the workplace. Patients who have used the splint to perform their work tasks in jobs ranging from handling materials to homemaking have reported satisfactory results. Once the therapist has mastered the technique of handling the two materials together and of fitting the splint within 15 seconds, this procedure is economical in terms of time and supply costs.

REFERENCES