

ORTHOPLAST-ISOPRENE: ITS USES IN CERTAIN SPLINTS AND SHIN GUARDS^a

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INTRODUCTION

Orthoplast-Isoprene is a thermoplastic material with optimum malleability, cohesiveness, and strength that simplifies fabrication of certain splint designs. It is also non-toxic, resistant to detergents, easy to keep clean, and unaffected by all common acids and solvents.

A most interesting characteristic is that it can be molded directly on the body, and although the softening temperature is 140 deg. C. (284 deg. F.), the recipient feels no heat discomfort. This material begins setting in approximately 20-30 seconds as it cools.

Orthoplast-Isoprene hardens to a rigidity that makes it suitable for wrist splints and shin guards—two areas covered in this report. Additional rigidity can be obtained by reinforcing with a laminating technique. It also has a buoyancy (useful for certain methods of hydrotherapy) and provides support in a cushioned manner when the peripheral edges are lined with felt padding. This is especially true in the case of shin guards. This material, however, is not intended to replace the plaster-of-paris cast in the initial stages of injury.

Orthoplast-Isoprene has the following additional advantages:

1. For use in fabricating prostheses, it can be molded and cut to shape with ease. It is lightweight and non-irritating, and it enables temporary prostheses to be made in less time.

2. For use as a splint, either temporary or long-term, it is exceptionally light and comfortable to wear and can be easily removed and remolded. "Drop-wrist" and arthritis are examples of conditions presently being treated with this technique.

3. Shin guards are fabricated of Orthoplast-Isoprene when scarring follows a compound fracture with extensive lacerations. A shell is shaped

^a Based on a paper presented at the Intra-VA Training Conference, Plastic Eye and Restorations Clinic Chiefs, Nov. 16-20, 1970, held at the Prosthetic and Sensory Aids Service, New York City.

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to fit the calf and then cut and sanded externally to an acceptable contour. It is held in place with Velcro and an elastic stocking—a quick and easy way to make a shin guard.

MATERIALS AND EQUIPMENT

The following materials and equipment are used when fabricating with Orthoplast-Isoprene:

1. Orthoplast-Isoprene sheets $\frac{1}{8}$ in. (3.2 mm.) to $\frac{1}{4}$ in. (6.35 mm.) thick.
2. Heat convection oven, thermostatically controlled at 140 deg. C.
3. Sharp knife or scissors
4. Tape measure
5. Fine emery grinding wheel
6. Velcro straps
7. Pencil or french chalk
8. Stockinet (optional)

SHIN GUARD OR FOREARM SPLINT FABRICATION TECHNIQUE

Allow the oven to reach operating temperature at 140 deg. C. To prevent adherence use the release paper or dust the oven shelf with french chalk.

Using a prepared pattern or measurement of the leg or forearm, estimate the amount required from the Orthoplast sheet and cut away with either a sharp knife or scissors.

There is no need to make an oversized allowance because Orthoplast expands approximately 1 in. per foot when heated. Surplus can be trimmed away when the support has been formed and cooled. Material which is still warm will "drag" against the knife blade and will be difficult to cut.

Heat the sample at 140 deg. C. for not less than 5 minutes. Cover the leg with stockinet, if desired, then remove the sheet from the oven (after 5 minutes at 140 deg. C.). Check that the surface heat is not too great, and mold it directly to the patient, stretching gently during the molding process. As it cools, Orthoplast will fully set during a period of 30 seconds to $1\frac{1}{2}$ minutes.

After 3 to 5 minutes, the shin guard or forearm splint may be removed, allowed to cool thoroughly, and then trimmed and finished with a very sharp knife, an emery wheel, or glass paper. Any markings on the Orthoplast-Isoprene surfaces can be cleansed away with warm water and detergent.

With trimming and finishing completed and the cosmetic appearance

satisfactory, splints can be held firmly and comfortably in position by means of two or three encircling Velcro fasteners.

TYPICAL CASES TREATED

Case A—(5/3/67—1/17/69—10/1/69)

Diagnosis: Cellulitis with lymphangitis with excoriation of skin in front of left leg.

The physician referred this patient to the Restorations Clinic for a vinyl plastic shin guard. It was prescribed to be worn over a garter hose along the entire area of the shin bone to give comfort to a painful area of excoriation.

On 5/3/67, a shin guard with Velcro attachments was fabricated for the patient.

On a followup appointment, some minor adjustments were made to suit the patient.

On 1/17/69, the patient reported with the complaint that the shin guard, through climatic changes and wear and tear by bumping, had cracked in several places. An attempt was made to remedy the situation by repairing the appliance with a quick set plastic and by reinforcing it with an additional strip of Orthoplast.

On 10/1/69, a new shin guard of Orthoplast-Isoprene of a more resilient consistency was fabricated (Fig. 1), that still retained the basic feature of protection. The peripheral edge was lined with a thin strip of felt.

The patient continued to wear the shin guard for over 1 year and was pleased with the results.

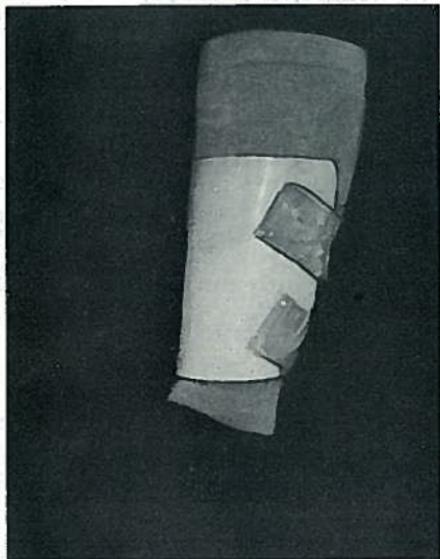


FIGURE 1

Case B—(10/1/70)

Diagnosis: Residuals of shell fragment wounds in the lower extremities.

This case was referred by the orthopedist for a plastic shin guard for the left leg, which was to extend from just below the knee to just above malleoli.

The purpose of this shin guard was to prevent continuous bruising caused by decreased sensation from vascular insufficiency.

Following the procedures described, a shin guard was fabricated that had the peripheral edges lined with a layer of felt (Fig. 2). The patient readily accepted the finished shin guard and has continued wearing his appliance regularly.

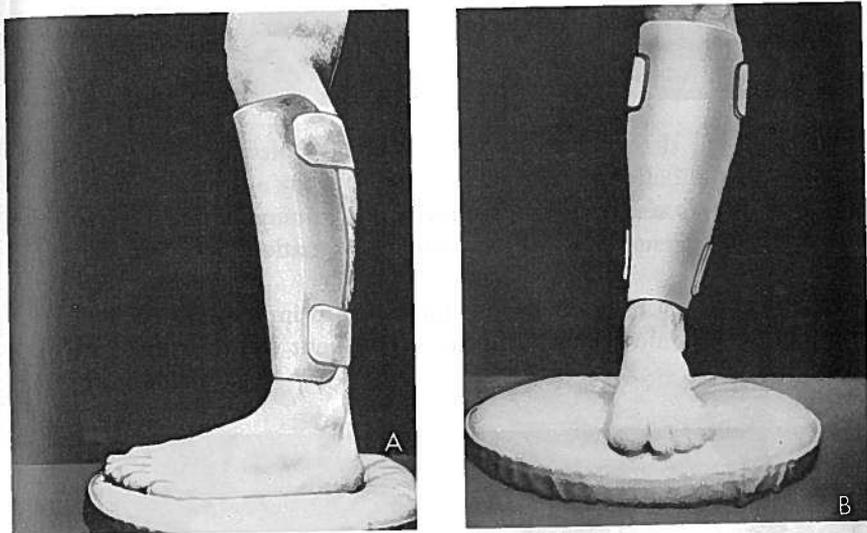


FIGURE 2

Case C—(10/28/70)

Diagnosis: Osteitis (Keinbock's Disease), chronic, right wrist.

Although this patient was wearing a hand brace for quite some time and doing well with it, he was referred to the Restorations Clinic by the orthopedic physician to see if this new material made into a hand splint would work as well.

A hand splint was successfully fabricated with lace and grommets (Fig. 3) for maximum immobility of the veteran's right wrist.

Case D—(9/9/66)

Diagnosis: Tubercular synovitis from injury to tendon sheath (three operations to remove growth on tendon sheath).

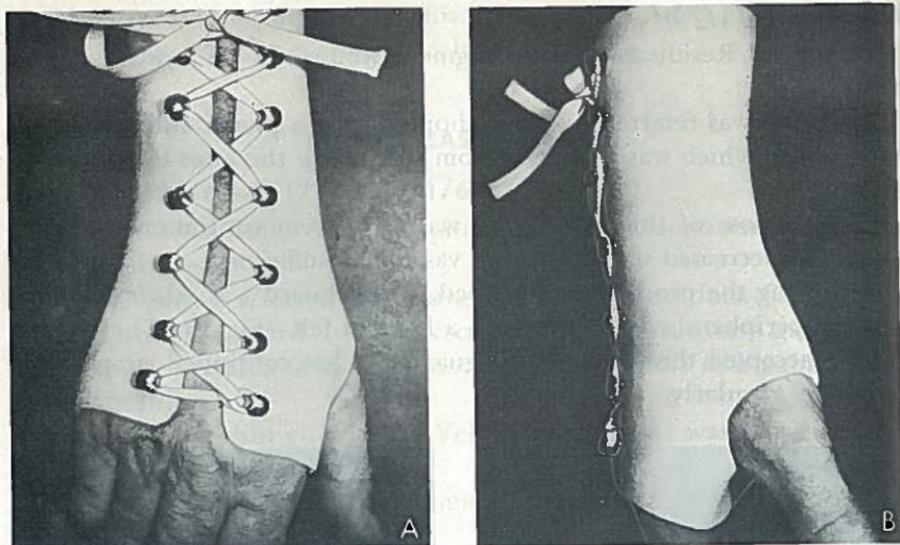


FIGURE 3

This case was sent to the Restorations Clinic approximately 5 years ago, and the patient is still wearing the splint made for him at that time (Fig. 4).

The orthopedist referred him to the clinic to immobilize his wrist action and thumb movement. Constant movement of either irritated the sheath area.

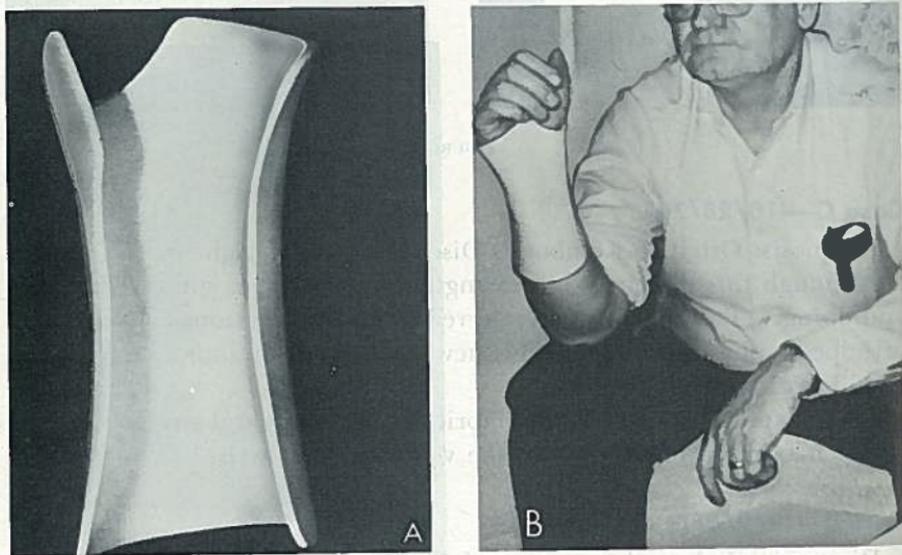


FIGURE 4

The patient claims that by wearing the splint all the time "inflammation and swelling are reduced."

SUMMARY AND CONCLUSIONS

The cases described in this paper are the result of a cooperative effort between the various departments and the staff of the Restorations Clinic at the VAOPC Philadelphia, Pa. VAOPC Philadelphia does not have an Orthopedic shop and as a result the Restorations Clinic is frequently called upon to contribute in furthering optimum patient care.

Prescribed by the physician primarily for certain short-term conditions, both passive- and active-type cases, the splint and shin guards have been accepted in appearance and function by many patients. These patients experienced relief of both wrist pain and leg bruising, they had reduced tissue swelling, and they were able to function at a higher level of independence.

Many veterans using these splints and shin guards are Vietnam-era casualties where the survival rate among the wounded is the highest in history, and with an inevitable increase in the number of veterans who live out their lives with some kind of permanent disability.