Method of Making the Leather Working Splint for the Wrist

Purpose of The Splint

- ▲ to reduce wrist pain and swelling
- ▲ to immobilize, protect and support the inflamed joint
- ▲ to maintain alignment of the joint
- ▲ to allow functional use of the hand.

Advantages/Disadvantages of Choosing Leather

Advantages

- the leather material offers:

- ▲ some breathability and flexibility
- ▲ greater degree of traction which allows easier grip on tools or in driving
- ▲ preferred cosmetic appearance by some clients

Disadvantages

- the leather material is:

- ▲ more difficult to clean
- ▲ not appropriate to use for wet and dirty activities (i.e. washing dishes, gardening, etc.)
- ▲ more expensive

Equipment/Supplies Required

- ▲ plaster hand cast
- ▲ paper towels
- ▲ wiss shears (for cutting poly. insert)
- ▲ leather shears
- ▲ 2.7 - 3 oz. leather
- ▲ pencil
- ▲ hole punch
- ▲ Helmitin contact glue
- ▲ baking tray with baby powder (for heating poly. insert)
- ▲ tensor bandage
- ▲ pasterine
- ▲ 3/4" "D" ring
- ▲ #1 rivets
- ▲ 3/4" velcro
- ▲ anvil & hammer

Splint Design

A plaster cast of forearm is required for fabrication of a LWS. See O.T. 11 A-1 method of making plaster casts for working splints. The leather is moulded on the cast in order to achieve the best possible fit of the splints.

Draw on the cast the proposed outline of the splint with a centering mark on the proximal edge of the volar side. Any tender areas (i.e. head of ulna) can be built up with plasticine.

Making a Pattern

Use strong and flexible paper approximately 10 ½" x 10 ½" (a paper towel is suitable). Fold 1" from midline and draw on the crease a thumb hole approximately 1" x ¾" wide and about 1" from the top of the paper. Cut out the hole. (See fig. 1).

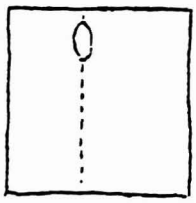


Fig. 1

Place the paper on the volar side of the plaster cast with the hole over the thumb and the opening on the dorsum of the forearm. Pleat the paper to fit the cast and secure the pleats with tape. The back opening should overlap slightly. Trim the pattern to extend from just proximal to the MCP joints to slightly more than half way down the forearm length. Transfer the centering mark on the volar side from cast to pattern. Take the pattern off the cast and place on the rough side of a piece of 2.7 - 3 oz. leather. Trace around the pattern, transferring the centering mark to the leather. Then put the pattern on the smooth side of another piece of leather and trace again. Cut out the leather pieces.

Moulding the Splint

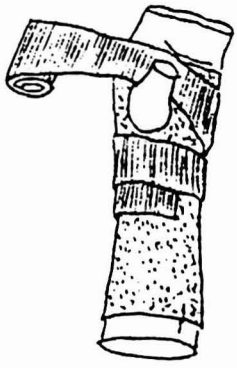
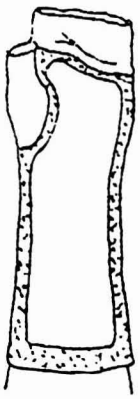


Fig. 2

Soak the first piece of leather in warm water until it is pliable. Drape it over the thumb, line up the center marks and firmly pull and mould the leather until it fits neatly without wrinkles. Bind it in place with a tensor bandage. (See fig. 2). (If the wrist is very slender in proportion to the forearm and hand, it may help to cut a larger thumb hole.) When this section is dry, take off the bandage and trim to size.

To increase rigidity of the splint insert a piece of polyethylene between the two layers of leather on the volar side (see fig. 3). To do this, heat it in an oven on a cookie tray lined with stockinette or thick coating of baby powder, at 250° until it is just clear. Do not overheat. Using gloves, quickly remove the plastic from the tray, drape it on the cast and mould firmly, and wrap an elastic bandage around cast to bind it in place until cool. Trim the polyethylene insert so that the distal edge is proximal to the proximal palmar crease, and is scooped out around the thenar eminence. The proximal edge should end 3-4 cm from the finished edge of the splint. Sand the edges on the grinder or with sandpaper so that they do not cause a ridge. Glue the poly-insert in place on the lining piece of leather. If more flexibility in the wrist splint is desired, the polyethylene insert can be omitted.



Repeat the moulding process with the other piece of leather, but this time put the smooth surface on the outside, so that the rough sides are together. (See fig. 4). Bind again and leave to dry.

Glueing The Splint Layers

Remove the bandage and mark the leather where it will not show so that corresponding edges will match when glued. Leaving the leather pieces on the cast and starting from the palm, apply the glue in sections (1" strips) and stick each section together before gluing the next. If desired, the dorsal sections of the splint can remain unglued so the straps can be inserted between the layers (i.e., the straps are riveted to the outer most leather layer only. The splint is then glued together after the straps are in place. The disadvantage of this method is the straps are very difficult to adjust at a later date.

Fitting the Splint

When fitted, the splint should:

a) allow comfortable opposition of the thumb, to the base of the little finger.

b) allow free movement of the MCP joints.

c) allow free pronation and supination of the forearm and flexion and extension of the elbow.

d) have no pressure points, especially over the head of the ulna (if so, pressure point can be pressed out with shoe stretcher and shoe stretching liquid).

e) have a slight overlap of back opening in order to prevent the splint from gaping.

f) reach approximately half-way down the forearm.

Attaching Straps

Use single thickness 4 - 5 oz. leather. Straps should be 5/8" wide and be secured with one well-flattened No.1 rivet. Use a D ring (3/4") for the strap over the wrist joint.

The rivet on this strap should be close enough to the D ring so that the D ring stands firmly enough to pass the strap through with one hand. The strap should be fixed so that they tighten when pulled away from the body. The fastenings should have the hook side of the velcro on the strap. The distal strap should be as distal as possible. The middle strap should not be over the ulnar head, and preferably be distal to it. The two most proximal straps should be evenly spaced. (See fig. 5).

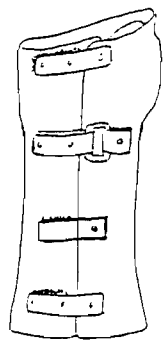


Fig. 5

Use Of The Splint

Test the patient's function when wearing the splint, especially in grasp, supination and opposition. Make sure the patient knows how to put the splint on and off and when to wear it. It should be worn when performing any tasks that cause wrist joint pain or are particularly stressful on the joint. If the patient is wearing the splint a lot, they should be advised to take the splint off several times a day for a few minutes whilst putting their wrist through its full range of motion. Provide patient with a copy of the handout OTTIID-I "Use and care of a wrist working splint".