

Thermoplastic Body Jackets for Control of Spine after Fusion in Patients with Scoliosis

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With the introduction of thermoplastics new applications and techniques are being sought for their utilization in spinal orthotics. One of the most recent applications is replacement of the plaster-of-Paris Risser body cast with a lightweight plastic jacket that has been developed and introduced by Dewey Friddle, C.P.O., Greenville, South Carolina.

The need for such a design which would provide stability, comfort, lightness, cosmesis, allow the wearer hygienic care, and still fit properly during the course of treatment, seemed to be apparent. Our experience in the various designs used for scoliosis, kyphosis, and lordosis orthoses led us to our initial fittings of postfusion body jackets. Several designs and materials have been employed since our initial fittings.

The Design

Our present design consists of a two-piece jacket molded from two to three millimeter-thick thermoplastic material, polypropylene or Subortholen, unlined (Fig. 1). Anteriorly it extends from the symphysis pubic to the sternal notch, with an opening for the breasts and posteriorly from the apex of the buttocks to the spine of the scapulae. The jacket is fabricated over a custom plaster cast of the patient

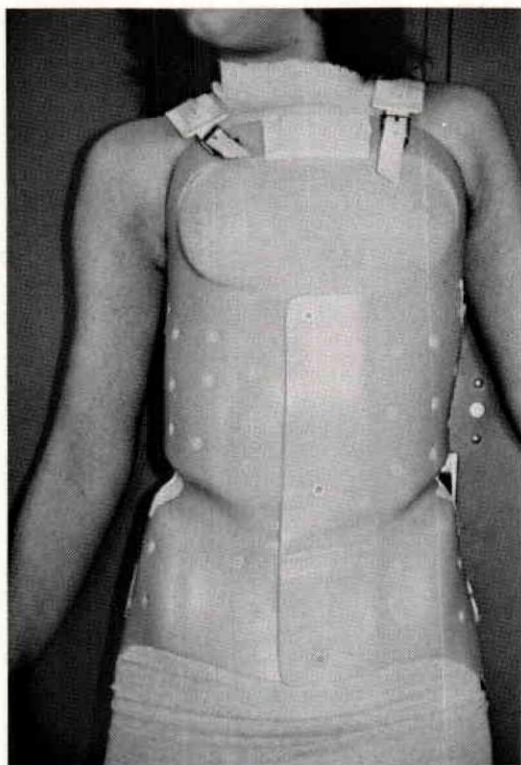


Fig. 1. Two-piece thermoplastic body jacket for control of spine after fusion.

and formed in two lateral shells overlapping anteriorly and posteriorly. The overlapping feature permits adjustment for growth during the average wearing period of nine months. The shells are

held together with Nyloplex rivets. Shoulder straps connect the posterior and anterior section of the jacket.

Because the jacket is designed to maintain the postsurgical position, not necessarily to correct it further, cast modifications are less drastic or severe than for a TLSO design.

Plaster Wrap

Both presurgical and postsurgical plaster molds have been employed. The presurgical impression is easier to take. When the cast is made postsurgically it is essential to compare the patient's cast to the achieved curve reduction and resultant increase in thoracic length. We have found that presurgical and postsurgical contours vary greatly and, hence, we now prefer the following technique.

Our method for postfusion casting is simple and is performed in the patient's bed three to four days after surgery.

While the patient is in a supine position, a cotton stockinet is applied carefully over the torso. The waist, ASIS, symphysis pubis, sternal notch, prominent ribs, and breasts are identified and marked with an indelible pencil (Fig. 2).

Plaster splints, 8 to 15 layers in thickness, are applied extending from symphysis pubis to sternal notch and laterally to midline (Fig. 3). After the plaster has set the patient is "log-rolled" to a prone position. The thick anterior section minimizes distortion that might take place as the patient is rolled over. Vaseline is applied to the edges of the plaster shell. The posterior section is applied to extend from the C-7 level to the gluteal fold and to overlap the anterior shell laterally by at least one inch. Five to eight layers of plaster are needed for this section. After the plaster has set, key marks are scribed onto the two halves, the posterior section is pried loose, and the stockinet cut for re-

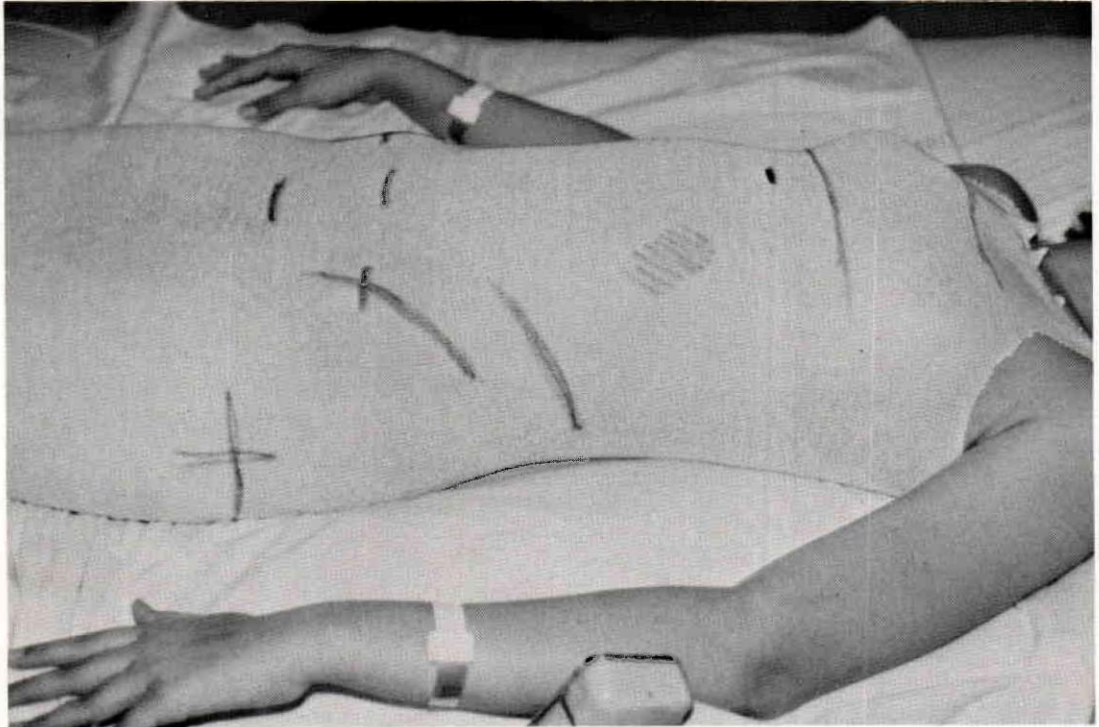


Fig. 2. Prior to casting the waist, ASIS, symphysis pubis, sternal notch, prominent ribs, and breasts are identified and marked on the cotton stockinet that covers the torso.

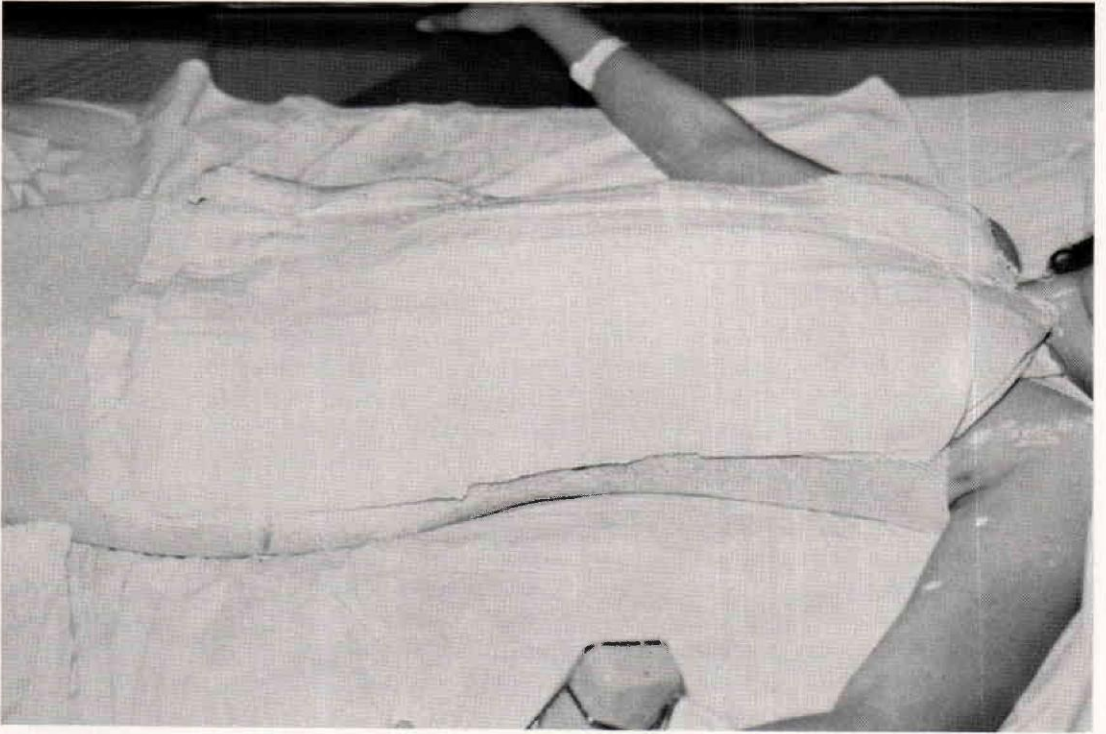


Fig. 3. Plaster splints, 8 - 15 layers in thickness, are applied to the anterior portion of the torso.

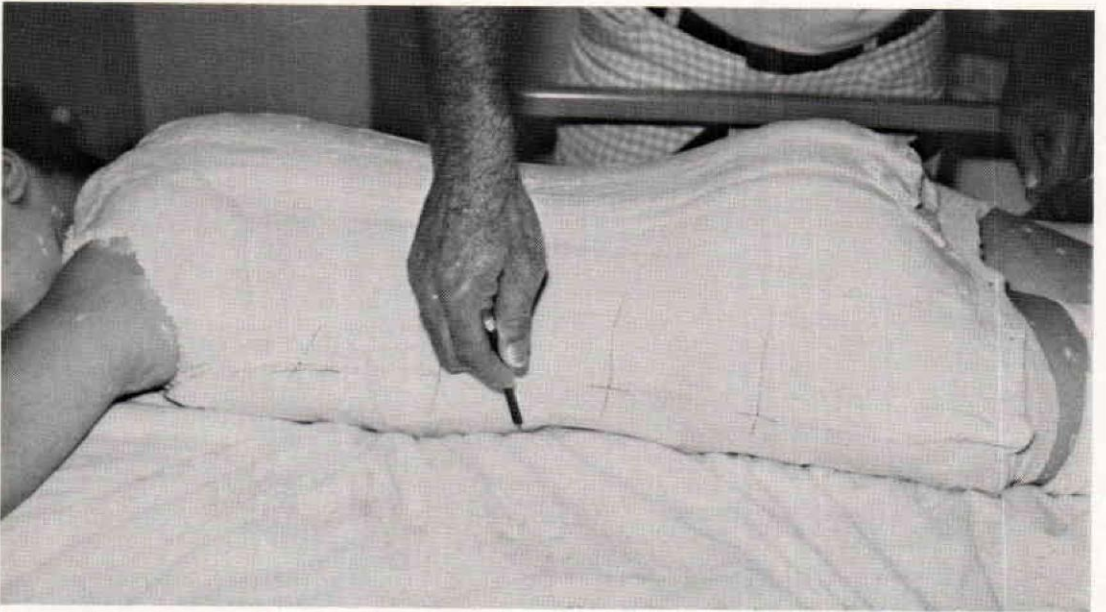


Fig. 4. Key marks are inscribed on the edges of the two halves of the plaster after it has set so that proper alignment can be maintained when the cast is poured.

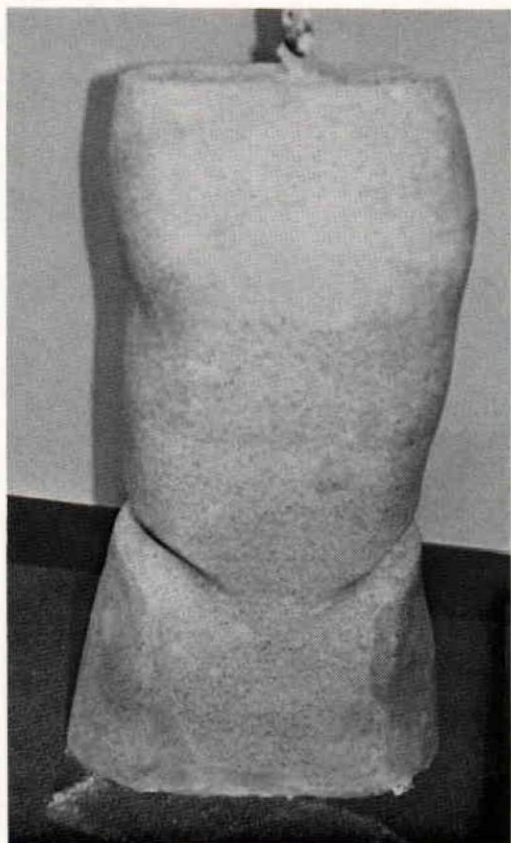


Fig. 5. The modified cast.

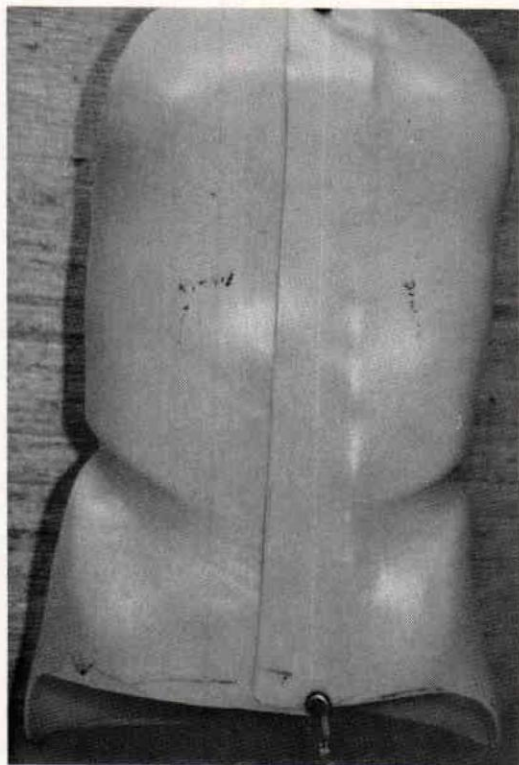


Fig. 6. Initial trimming of the orthosis is conservative.

removal of the posterior shell (Fig. 4). The patient is "log-rolled" into the supine position and the anterior half is removed.

The sections are now realigned and secured together with plaster bandage. Cast modifications similar to those used in fabrication of a TLSO or a Milwaukee pelvic section are carried out (Fig. 5).

Fabrication

Depending on the material selected either drape forming or vacuum forming techniques may be used. Initial trimming is conservative leaving the module long and untrimmed for the breast area (Fig. 6). We have found that for best results the module is applied to the patient and the desired trim lines are marked on the

jacket. Donning the jacket is accomplished by having the patient roll to one side and applying one section and then roll to the opposite side and applying the other section. The two halves are temporarily held with tape (Figs. 7 and 8).

Fitting

The jacket is applied six to eight days after surgery over a cotton stockinet which can be removed for bathing. The jacket is taped together and worn for at least 24 hours, in order to allow for removal under a nurse's supervision if the initial fit requires alteration. The patient is allowed to sit and walk immediately with nurse supervision. Discharge is permitted one to two days after the delivery of the jacket and the tape closure is replaced with Nyloplex rivets (Fig. 1).

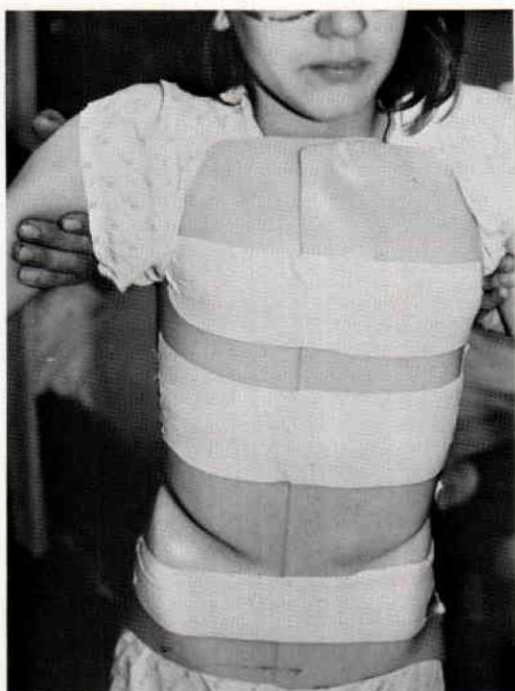


Fig. 7. Anterior view of orthosis being held in place with tape during fitting process.

Results

To date we have fitted more than 30 postfusion jackets. We have employed various materials, with various thicknesses and trim lines, and have found certain advantages in Subortholen. This material lends itself well for this application due to its strength, malleability, and durability. Early jackets were of two-millimeter thick polypropylene that required vacuum-forming equipment. We feel that polypropylene's strength is satisfactory, but its workability does not compare to that of Subortholen for this use.

Because a liner is not used, the patient may remove the stockinet without removing the jacket and bathe.

Clinically, our results are promising, and radiographically comparable to conventional plaster Risser casts. The weight difference between the Risser cast, about 20 pounds versus a 2-pound plastic jacket, need not be elaborated upon. We

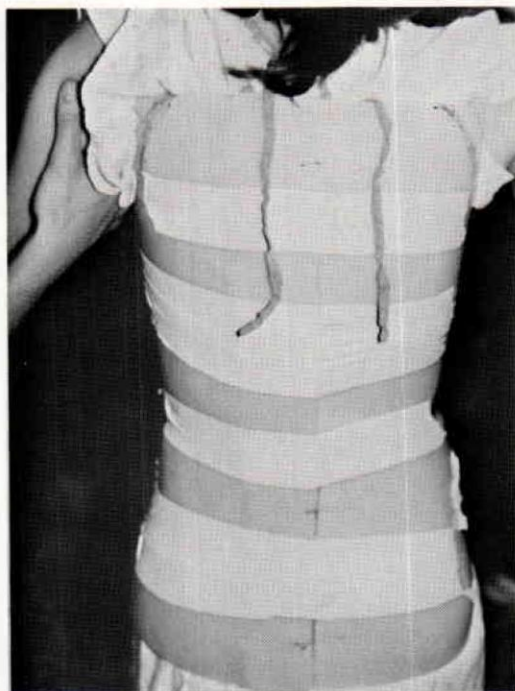


Fig. 8. Posterior view of orthosis being held in place with tape during the fitting process.

currently feel that the advantages of this system far outweigh the few difficulties we have had. There are two primary problems that we still have to contend with: 1) the jacket tends to migrate superiorly, and 2) several cases of heat rash have occurred, which we feel are the result of inadequate ventilation.

We intend to follow this report later by recording one-year postfusion results. To date we have been recording age, sex, casting technique (preoperative or postoperative), material used, thickness of the material, initial postoperative degree of curvature, and one year postoperative curvature for each patient.

Footnotes

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