

A Modified Spine Brace

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The medical literature of the past two decades is well endowed with descriptions of various types of spine braces. The majority of these are quite adequate and are as comfortable as an appliance of this type is expected to be. The brace to be described is the result of modifications of previously described braces; thus I claim little originality. In 1937, Arnold(1) described an efficient back brace. Using Arnold's brace as a pattern, I have made a number of modifications designed to increase the range of usefulness of the appliance and to increase patient comfort. In 1942, Baker(2) described a brace that he used on patients with arthritis of the spine, and Williams(3) described a brace for use in flexion management of low back conditions. Some of the ideas embodied in these two braces have been incorporated in the apparatus herein described.

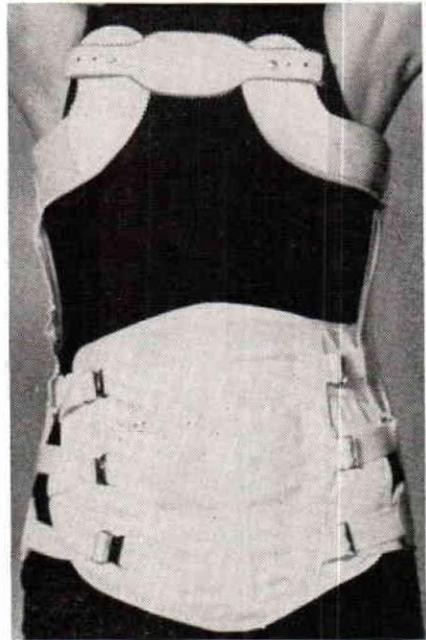
Uses

As do most orthopedic appliances, this brace has its limitations, and it is not intended for the treatment of all conditions involving the spine. It is designed primarily for immobilization or stabilization of the spine from the sacrum to the seventh thoracic vertebra and is not intended for the support of the cervical and first seven thoracic vertebrae. Lumbosacral fusions can be adequately supported by shorter braces, and consequently this apparatus is not intended for that purpose. I have used this brace for the treatment of fractures of the thoracic spine distal to the seventh thoracic vertebra, thoracic kyphosis caused by juvenile epiphysitis, rheumatoid spondylitis, and incorrect posture. It has been an excellent brace for the treatment of fractures of the thoracic and upper part of the lumbar spine and has been successfully used post-operatively for fusions of the thoracic and lumbar spines. It has been used to support the spine during recovery of patients from poliomyelitis and is particularly useful in those instances in which the respiratory musculature is involved, as in bulbar poliomyelitis.

Advantages

This brace has a number of distinct advantages from the point of view of patient comfort. The apparatus is constructed from measurements taken on a flexible jig, and all components are built to conform to the contours of the patient's body. Accurate measurements can be taken in the hospital or in the doctor's office, and rarely are more than minor adjustments necessary after the brace is completed. The brace is lightweight, easily adjusted, and may be put on in the operating room and adjusted to meet individual

Fig. 1. (A) Anterior view: Chest pieces may be made lower and transverse strap may be removed.



requirements at any given moment (see figure A). The axillary portion of the brace does not extend high enough into the axillas to be uncomfortable and allows freedom of movement of the upper extremities (see figure B). The lower or pelvic band is form-fitted and grips the pelvis in such a manner that the brace does not ride up or down when the patient moves. The posterior longitudinal bars (see figure C) are placed 4 inches apart, 2 inches on either side of the spinous processes, to allow for a surgical dressing in the event that the brace is being used after a spinal fusion. Furthermore, placing the longitudinal bars in this way decreases pressure over the spine itself and adds considerably to the patient's comfort. The lack of constricting bands about the lower part of the chest makes the brace a useful appliance both in injuries in which there has been damage to the chest wall and in conditions in which there is concomitant respiratory embarrassment without injury to the patient. For instance, the brace has been used on a 6-year-old boy recovering from bulbar poliomyelitis; it supported the spine and shoulders without respiratory interference. The absence of over-the-shoulder straps makes this brace useful in instances in which there is an injury to the shoulders with concomitant injuries to the spine.

Description

The brace is a singularly uncomplicated appliance. It consists of a pelvic band molded to the contours of the sacrum and ending immediately beneath the anterior superior iliac spine. Thus, the pelvic band fits well, does not slide around when the patient moves, and becomes a well-stabilized point of fixation for the lower portion of the brace. The upper circumferential band fits snugly against the upper portion of the back and varies considerably in its contours depending upon the degree of immobilization

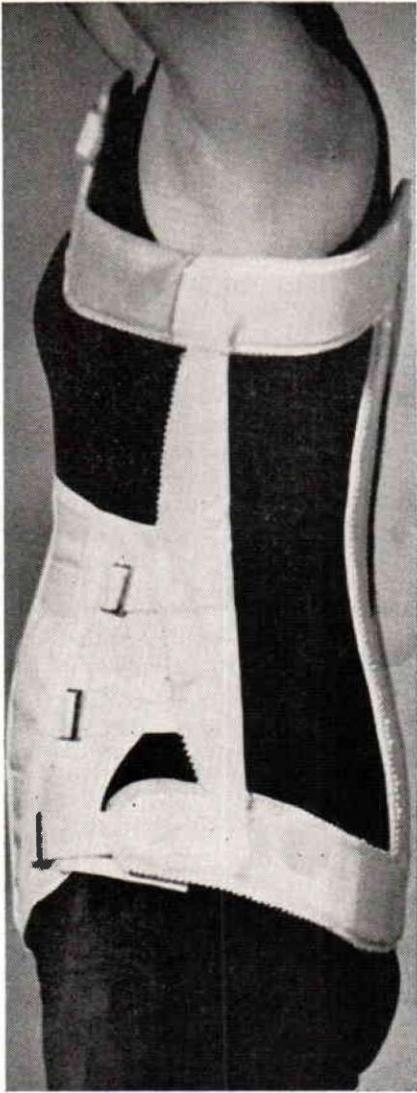


Fig. 2. (B) Lateral view.

Fig. 3. (C) Posterior view: Note space between upright bars.

required. It extends anteriorly beneath the axillas on each side and then curves upward to end in a wide flare that conforms to the anterior chest wall in the pectoral region. There are four longitudinal or upright bars; two are placed posteriorly 4 inches apart and the remaining two lie in the mid-axillary line, one on each side. A light leather strap connects the two anterior chest pieces to prevent separation.

Fabrication

The construction of this brace is quite simple, but its usefulness is dependent upon careful and exact fitting. Therefore, I have found it best to take measurements with a flexible jig. The flexible jig is made to conform to the patient's body and then taken to the brace shop where component

parts of the brace are made to conform to the configurations and measurements of the jig. This jig is similar to or the same as those found in many brace shops, and requires no particular talent to either construct or to use.

I believe the pelvic band to be the most important part of the brace. This takes a little more time and care than the upper circumferential band or the upright pieces. The pelvic band is made of 18-gauge, 24 S. T. Dural. It is $1\frac{3}{4}$ inches in width and must be made to fit snugly over the sacrum and to terminate beneath the anterior superior iliac spines. At this point, it must flare slightly to conform to the soft tissues.

The upper circumferential band is made of 24-gauge Dural and also is $1\frac{3}{4}$ inches in width. It is cut from a sheet of metal and molded to conform to the specifications required. The final shaping of the anterior chest portion of the upper circumferential band is left to the final fitting.

The upright bars are made of 24-gauge Dural, one half inch in width. All parts are polished and drilled and the upright part is padded with either felt or foam rubber and covered with elk hide prior to assembly of the brace. It has been our practice to sew only one side of the brace covering since this is less time consuming and there is only one half as much sewed area to break out. The upright bars are then riveted to the pelvic band and the upper circumferential band with stainless steel rivets, two at each point of contact. The upper and lower circumferential bands are then padded and covered with elk hide. It must be noted that the axillary portion of the upper circumferential band is heavily padded with sponge rubber prior to its covering with elk hide. It has been our practice to cut the sewed edge of the elk hide with pinking shears which appeals to the ladies and helps to eliminate rolling and tearing.

The posterior longitudinal bars are placed four inches apart with the medial edge two inches from the center line of the brace. The lateral upright bars are placed in the midaxillary line. The placement of the upright bars is very important since placing the posterior bars too close together will produce pressure on the spine particularly if the brace is being used following a spine fusion. Placing of the lateral upright bars too far forward or too far back will result in both inadequate support and marked discomfort as far as the patient is concerned.

The abdominal apron is made in the usual manner with three adjustable straps on each side. I have found it more comfortable not to put stays in the apron but to make it of sufficiently heavy material to prevent rolling and wrinkling. The transverse chest strap is made of elk hide or other suitable leather and lined either with flannel or mole skin. It is attached on each side by means of a stud set into the chest portion of the upper circumferential band.

Summary

A simple but useful spine brace has been developed that has a wide range of usefulness and is more comfortable to the patient than previously described braces.

References

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2. Baker, L. D.: Rhizomelic Spondylosis: Orthopaedic and Roentgen Therapy, J. Bone & Joint Surg. 24: 829-830 (Oct.) 1942).
3. Williams, P. C.: Lesions of Lumbosacral Spine, J. Bone & Joint Surg. 19: 690-702 (July) 1937.