A Brace for the Management of Fracture Dislocation of the Cervical Spine: Traction, Immobilization, and Myelography

Technical Note

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Since damage from transection or severe contusion of the spinal cord in man is irreversible in that regeneration does not occur, it is imperative that every effort should be made to avoid or reduce to an absolute minimum any additional trauma that may readily occur during transportation of patients with fracture dislocation of the cervical spine. It is also necessary to decide as soon as possible whether surgical intervention is indicated. This question is usually resolved on the basis of clinical examination supported by x-rays and myelographic evidence in the case of tumors and other chronic lesions of the spinal cord and its surrounding structures. With fracture dislocations of the cervical spine, the risks and difficulties of performing myelography with the patient in traction are so great that this procedure is rarely carried out, even though there are situations in which this information would be of great value in deciding on the best method of management.

For these reasons, a more adequate method of handling these acute emergencies is necessary. A brace is described here which is simple, practical, and appears to meet all the requirements for management of the acute phase of cervical spine injuries.

Requirements

Ideally, such a brace should:

1. Provide secure immobilization with traction of the cervical spine of up to approximately 30 lbs applied via skeletal tongs or halter,
2. Enable the patient to be transported in it with ease and safety,
3. Permit x-ray examination of the cervical spine in the brace without interference in either the anteroposterior or lateral projections,
4. Permit lumbar puncture and myelography without difficulty,
5. Be adjustable to any adult body shape and if possible to older children,
6. Be easy to apply and remove, lightweight, and reasonably comfortable.

Design

The brace designed to respond to these requirements is shown in Fig. 1. It is composed of five main parts: a molded plastic pelvic girdle, adjustable shoulder straps, a head plate, four adjustable uprights, and the traction mechanism.*

The pelvic girdle is fashioned out of symmetrical plastic halves molded to fit over the iliac crests and upper buttocks with enough free space anteriorly and posteriorly to avoid overriding in individuals with a small pelvis and adequate room posteriorly to permit lumbar puncture to be performed for myelography. Straps and buckles permit firm comfortable adjustment of the pelvic band. It should be noted that the brace shown in Fig. 1 has now been modified; the pelvic girdle has been trimmed by 1 1/2 in. on each side both anteriorly and posteriorly because in slender individuals overriding did occur.

At the shoulder level, two 2-in. wide soft leather straps which can be slid up and down the uprights and fixed at any level provide a second point of support for the brace. The head plate is a rectangular 5/8 inch aluminum plate with two parallel slots measuring 5 in. and 7 1/2 in. respectively. A second smaller plate that carries a grommet rides on top of the head plate and can be fixed in any desired position on the latter by means of wing nuts. This sliding plate permits more or less extension to be applied to the head. Four threaded rods are attached to each corner of the head plate and fitted into the four

* This brace can be obtained from the Stryker Corporation, 420 Alcott Street, Kalamazoo, Michigan 49001.

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uprights; these are cylindrical aluminum tubes attached by universal joints to the pelvic bands and by metal sliders fixed to them by wing nuts to the shoulder straps. Thus, the length of the brace can be easily adjusted manually by means of nuts on the threaded rods, which allow a greater or less penetration of the rods.

The traction system consists of a Chatillon gauge graduated from 0 up to 50 lbs. It is attached by means of a slider to one of the uprights and can be fixed in position by means of a knurled hand nut (Fig. 1 left). The requisite degree of traction is delivered by means of a chain (breaking strain 100 lbs) which passes from the Chatillon gauge through the grommet on the corner of the base plate, through the grommet on the sliding plate, and descends to end in a hook that attaches to the traction device (skeletal tong or head harness). A spreader is provided so that, in the event that halter traction is instituted first and skeletal traction later becomes necessary, the temporal area can be exposed for the requisite incisions and skull perforations while the patient is still in halter traction (Fig. 1 right).

Use

Application. This brace is relatively simple to apply, requiring about 5 minutes. Ample adjustment both for body diameter