

General Description

Thoracolumbar orthoses (TLOs) are used mainly to treat fractures between T10 and L2, because their mobility is not restricted by the ribs, unlike fractures between T2 and T9. Immobilization at T10-L2 helps to prevent further collapse.

CASH brace

The cruciform anterior spinal hyperextension (CASH) brace, shown below, features anterior sternal and pubic pads to produce force opposed by the posterior pad and strap around the thoracolumbar region. Sternal and pelvic pads attach to the anterior, metal, cross-shaped bar, which can be bent to reduce excess pressure on the chest and pelvis. The brace is easy to don and doff, but it is difficult to adjust. It provides greater breast and axillary pressure relief than does the Jewett hyperextension brace (described below). Two round upper chest pads can be used instead of the sternal pad to decrease discomfort around the breast area. The average cost of a CASH brace is approximately \$460.



Cruciform anterior spinal hyperextension (CASH) brace with round anterior chest pads.

Indications for the use of a CASH brace include the following:

- Flexion immobilization to treat thoracic and lumbar vertebral body fractures
- Reduction of kyphosis in patients with osteoporosis

Motion restrictions provided by the CASH brace include the following:

- Limits flexion and extension at T6-L1
- Ineffective in limiting lateral bending and rotation of the upper lumbar spine

Contraindications to the use of a CASH brace include the following:

- Three-column spinal fractures involving anterior, middle, and posterior spinal structures
- Compression fractures caused by osteoporosis

Jewett hyperextension brace

The Jewett hyperextension brace, shown below, uses a 3-point pressure system with 1 posterior and 2 anterior pads. The anterior pads place pressure over the sternum and pubic symphysis. The posterior pad places opposing pressure in the midthoracic region. The posterior pad keeps the spine in an extended position, and its lightweight design makes it more comfortable than the CASH brace. Pelvic and sternal pads can be adjusted from the lateral axillary bar, where they attach. The pads can cause discomfort from pressure applied to a small surface area. No abdominal support is provided with this device. When the patient is seated, the sternal pad should be half an inch inferior to the sternal notch, and the pubic pad should be half an inch superior to the pubic symphysis. The Jewett brace costs approximately \$460 and is not custom-molded.



Jewett® hyperextension brace. Image courtesy of Florida Brace Corporation.

Indications for the use of a Jewett brace include the following:

- Symptomatic relief of compression fractures not caused by osteoporosis
- Immobilization after surgical stabilization of thoracolumbar fractures

Motion restrictions provided by the Jewett brace include the following:

- Limits flexion and extension between T6-L1
- Ineffective in limiting lateral bending and rotation of the upper lumbar spine

Contraindications for the use of a Jewett brace include the following:

- Three-column spinal fractures involving anterior, middle, and posterior spinal structures
- Compression fractures above T6, because segmental motion increases above the sternal pad
- Compression fractures caused by osteoporosis

One important consideration in the use of the Jewett brace is that it is more effective than the CASH brace. The Korsair brace is a modification of the Jewett brace, with added abdominal support for increased rigidity. The cost of the Korsair brace is similar to that of the Jewett brace.

Indications for the Korsair brace include the following:

- Symptomatic relief of compression fractures not caused by osteoporosis
- Immobilization after surgical stabilization of thoracolumbar fractures
- Flexion immobilization to treat thoracic and lumbar vertebral body fractures

Motion restrictions and contraindications associated with the Korsair brace are similar to those of the Jewett brace.

Knight-Taylor brace

The Knight-Taylor brace features a corset-type front with lateral and posterior uprights and shoulder straps to help reduce lateral bending, flexion, and extension. The shoulder straps may cause discomfort in some patients. The brace can be prefabricated and made with polyvinyl chloride or aluminum. The posterior portion of the brace has added cross supports below the inferior angle of the scapula and features a pelvic band fitted at the sacrococcygeal junction. The anterior corset is made of canvas and provides intracavitary pressure. The anterior corset is laced to the lateral uprights. The average cost of the Knight-Taylor brace is approximately \$540.

Use of the brace is indicated when flexion immobilization is required to treat thoracic and lumbar vertebral body fractures.

Motion restrictions associated with the Knight-Taylor brace include the following:

- Limits flexion, extension, and lateral bending
- Poor rotation control

Thoracolumbosacral orthosis

A custom-molded plastic body jacket, or thoracolumbosacral orthosis (TLSO), is fabricated from polypropylene or plastic. It offers the best control in all planes of motion and increases intracavitary pressure. This orthosis has a lightweight design and is easy to don and doff. The material is easy to clean and comfortable to wear. This brace sometimes is referred to as the clamshell.⁷

The TLSO provides efficient force transmission, with pressure distributed over a wide surface area; it is therefore ideal for use in patients with neurologic injuries. The brace may have a tendency to ride up on the patient when he/she is in a supine position. Plastic retains heat, but an undershirt will help to absorb perspiration and protect the skin. Frequent checks to ensure proper fit will aid in preventing pressure ulcers. Velcro straps are used to tighten the brace. The average cost of a TLSO made with polyform material is \$1250-\$1700.

Indications for the TLSO include the following:

- Immobilization for compression fractures from osteoporosis
- Immobilization after surgical stabilization for spinal fractures
- Bracing for idiopathic scoliosis
- Immobilization for unstable spinal disorders at T3-L3

Motion restrictions for the TLSO include the following:

- Limits sidebending
- Limits flexion and extension
- Limits rotation to some extent

Clinical information on the custom-molded TLSO suggests that it is more effective in the prevention of idiopathic scoliosis curve progression than are the Milwaukee brace and the Charleston bending brace (described below). A retrospective cohort study found that the mean curve progression with a TLSO was less than 2°, while curve progression with the Charleston and Milwaukee braces was greater than 6°. ⁸ According to the report, fewer than 18% of patients treated with a TLSO brace required surgery for scoliosis, compared with 23% of patients treated with a Milwaukee brace and 31% of patients treated with a Charleston brace.

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