



## Clinical Specialties in Orthotics and Prosthetics

# Orthoses to immobilise and heal acute spinal column injuries

### What is an acute spinal column injury?

- An acute spinal column injury occurs when there is damage to the structures of the spinal column, including bone (vertebrae), ligaments and soft tissue. Typically, a spinal column injury occurs due to trauma.
- The most common type of spinal column injury is a compression fracture of the thoracic spine.
- Spinal fractures can also occur due to distraction, translation or rotational forces, or any combination of these.

### What is the role of orthoses in managing acute spinal column injuries?

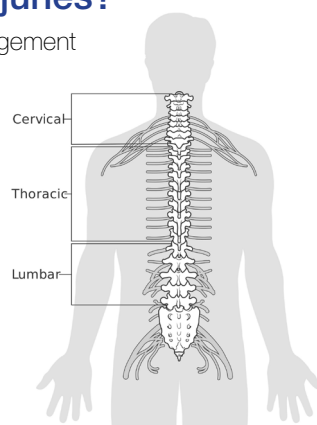
The immediate goal of orthotic management of acute spinal column injury is to immobilise and stabilise the spine through an externally applied force, to prevent further injury, aid healing and minimise pain.

Orthotists use biomechanical principles and knowledge of anatomy, physiology and materials science to adapt orthotic designs to individual patient requirements and ensure the correct positioning and application. Correct positioning and application is essential to minimise the risk of further collapse or mal-alignment of the spinal column.

Spinal orthoses may be used as part of non-operative or post-operative management.

### What are spinal orthoses?

A spinal orthosis is an externally applied device, designed and fitted to the body to protect and support the spine after injury or following surgery. Spinal orthoses can be applied to any section of the spine (cervical, thoracic, lumbar, sacral or all of the above)



*The different regions of the spine or vertebral column.*

and are named by the anatomical body part over which they are acting. Spinal orthoses may be commercially produced or custom made. They are prescribed with consideration of the location and severity of the injury, how the orthosis is intended to act and individual patient characteristics.

Spinal orthoses for management of acute spinal column injuries include:

- Cervical orthoses (CO)
- Cervico-thoracic orthoses (CTO) including halo thoracic orthoses (HTO)
- Thoraco-lumbo-sacral orthoses (TLSO)
- Lumbo-sacral orthoses (LSO).

### Cervical orthosis (CO)

COs (or cervical collars) are often fitted pre-hospital admission by emergency staff, including ambulance officers and paramedics to immobilise the cervical spine in cases of suspected spinal column injury. After a patient is admitted to hospital, orthotists are involved in fitting custom-made or customised orthoses to provide immobilisation at any spinal level.



*A 'Philadelphia' Collar, a type of Cervical Collar.*

COs are classified as either 'soft' – providing comfort and proprioception (awareness of body position) but offering minimal immobilisation; or rigid – providing moderate immobilisation of the mid-cervical spine. Most rigid COs are made of bi-valved plastic shells with removable pads. Examples of rigid COs include the 'Philadelphia' collar, the 'Miami J' collar, the 'Aspen' cervical orthosis and the 'Malibu' collar.

### Cervico-thoracic orthosis (CTO)

CTOs generally consist of supports to the chin and base of the skull which are attached to a thoracic vest. Compared with rigid COs, these orthoses improve control of the spine, particularly the middle to lower cervical spine and upper thoracic spine. Examples include the sterno-occipito-mandibular immobiliser, or 'SOMI', the 'Minerva' CTO and the 'Miami' JTO.



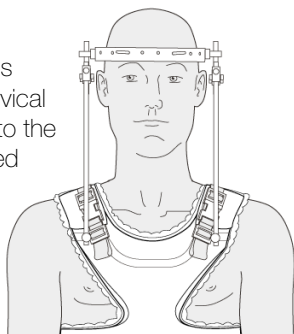
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## Orthotists – supporting the Australian community

### Halo thoracic orthosis (HTO)

The HTO is a type of CTO that provides the most rigid immobilisation of the cervical spine. It involves an external ring fixed to the skull with multiple pins which is attached to a thoracic vest by four connecting rods. The orthotist applies the HTO to optimise the patient's treatment, this includes correct pin placement, suitable pin tension and appropriate jacket fit. HTOs are particularly effective in managing unstable fractures or dislocations of the cervical spine, in situations where rigid COs or CTOs are likely to allow too much movement. The HTO cannot be used when a client has skull fractures, poor bone quality or osteoporosis.



A diagram of a Halo Thoracic Orthosis.

### Thoraco-lumbar-sacral orthosis (TLSO)

TLSOs provide support and limit motion of lower thoracic and upper lumbar spinal column injuries. Thoracic fractures are most commonly anterior compression fractures, occurring as a result of hyper-flexion and compression forces. TLSOs may be prefabricated or custom made, examples include the 'Jewett' orthosis, a prefabricated hyperextension orthosis, and the 'Boston Over Brace', a custom made plastic body jacket.

### Lumbo-sacral orthosis (LSO)

Injury to the lumbar vertebra may be managed using a custom-moulded LSO or TLSO. A fabric and metal corset LSO will provide proprioception and some restriction of movement, whereas a custom-moulded plastic LSO provides greater rigidity and improved stabilisation in all three planes.

## Complications

Noncompliance or misuse of the spinal orthosis may contribute to sub-optimal healing of the spinal injury. Therefore, all clients using spinal orthoses following spinal column injuries require ongoing radiographic and clinical follow-up to ensure effective treatment. Other possible complications include the inability to drive or work, skin breakdown and poor stabilisation due to incorrect application and improper wear.

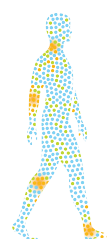
## Who provides spinal orthoses?

Orthotists (*pron. or-tho-tists*) are tertiary qualified allied health practitioners who specialise in the clinical assessment, provision and ongoing review of orthoses. This includes education, therapy and device maintenance. In Australia, orthotists are trained in both disciplines of orthotics and prosthetics at either a Bachelor or Masters level. Orthotists work autonomously and as integral members of the multidisciplinary team. **Certified Orthotist/Prosthetists (c-OP AOPA)** can be located using the 'Find a practitioner' search function on the AOPA website ([www.aopa.org.au](http://www.aopa.org.au)).

## How do I access orthotic treatment for acute spinal column injuries?

If an orthosis is required to provide immobilisation of an acute spinal column injury, most commonly a referral will be forwarded to an orthotist, which usually occurs as an inpatient in hospital, but can also be managed as an outpatient. The orthotist will:

- Perform a clinical assessment
- May prescribe and provide a spinal orthosis, which includes measurement, manufacture and fitting of the orthosis
- Provide ongoing clinical support and education, including regular reviews
- Adjust and/or replace the orthosis to maintain an optimal fit
- Liaise with relevant members of the healthcare team



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Disclaimer – This fact sheet does not replace clinical advice. If you require orthotic services AOPA recommends speaking to your practitioner. This fact sheet was developed based on interpretation of current evidence as of November 2017. References available on request.