



TheAlfred

THE ALFRED
SPINAL CLEARANCE MANAGEMENT
PROTOCOL
(Updated: November, 2009)

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There is no obligation to utilise this document. However, should the contents of the document be appropriate to your institution, please utilise to any extent required.

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SPINAL CLEARANCE MAJOR TRAUMA PATIENTS

Introduction

The most appropriate procedure for the determination of cervical spine stability in trauma patients remains a subject of much debate. Cervical spine clearance protocols aim to avoid missed injuries but must be balanced against the potential for increased morbidity associated with prolonging the time to spinal clearance or diagnosis of injury. The risk of significant occult discoligamentous injury, while small, has potential for serious physical, economic and medicolegal ramifications. The most effective protocol for detecting such injuries is debated, particularly in unconscious trauma patients. There have been no prospective, randomised controlled trials for the utilisation of a particular radiographic imaging procedure to detect cervical spine instability in trauma patients. As a result, no benchmark for cervical spine clearance exists.

According to numerous prospective and retrospective cohort studies, cervical spine injuries occur in 2.0-6.6% of blunt trauma patients,¹⁻⁷ with the co-existence of head injury increasing the incidence of cervical injury.^{2,6,8} Missed or delayed diagnosis of cervical spine injury occurs in 4-8% of patients.⁹ Of the patients with missed or delayed diagnosis of cervical spine injury, 70% have altered levels of consciousness.¹⁰ No study, however, has included meticulous long term follow-up of trauma patients to ascertain the true rate of cervical spine injury. Furthermore, the "gold standard" in terms of imaging protocols for injury detection is debated.

Many trauma centres advocate the use of traditional protocols for spinal clearance. Most recent studies suggest that technically adequate and properly interpreted plain films and thin cut CT with sagittal reconstruction, in areas of the spine in which visualisation is poor or where suspicion of injury exists, have a false negative rate of only 0.1%.¹¹

Routine MRI may also have a limited role in cervical clearance protocols for unconscious trauma patients¹²⁻¹⁷ who, by nature of their mechanisms of injury and Injury Severity Score (ISS), are at extremely high risk of cervical injury. Equally, MRI is unlikely to be appropriate for routine cervical clearance of all unconscious trauma patients.^{12,18,19}

This Alfred Hospital clinical management protocol for spinal clearance was developed according to evidence-based guidelines and study findings, some of which were conducted at The Alfred, and is the result of the collaboration of representatives from ICU, Trauma Surgery, Neurosurgery, Emergency & Trauma Centre, Radiology and Allied Health.

HISTORY OF CERVICAL SPINE CLEARANCE FOR UNCONSCIOUS TRAUMA PATIENTS AT THE ALFRED

| <u>Year</u> | <u>Cervical Spine Protocol for Unconscious Trauma Patients</u> |
|-------------|---|
| 1992 | AP, Lateral & Odontoid Plain Films Swimmer's view if lateral film inadequate (ie. C7/T1 not visualised) Passive bedside flexion/extension views Conscious patients can be clinically cleared Documentation of spinal clearance in progress notes of medical record Plain films considered cleared when judged to be normal by two consultants i.e. Radiology, ICU or Neurosurgical consultant |
| 1995 | Dynamic flexion/extension fluoroscopy to be carried out in radiology department ¹ |
| 1998 | Cervical spine CT - 3mm cuts from C1-C3 added to protocol |
| 1999 | Cervical spine CT - 1mm cuts from C1-C3 with sagittal and coronal reconstructions replaced odontoid plain views ²⁰ 3mm cuts from C7-T2 replaced swimmer's views |
| 2000 | Cervical spine CT – 3mm cuts from C2-C6 added to protocol Dedicated chart introduced for documentation of spinal clearance Introduction of an algorithmic imaging protocol which included MRI |
| 2001 | Dynamic flexion/extension fluoroscopy removed from protocol ^{20,21} Cervical spine cleared from normal plain films and helical single slice CT imaging with reconstructions |
| 2002 | Update of Cervical Spine Imaging Protocol Cervical spine CT- 3mm cuts extended to T4/5 |
| Feb 2004 | Discovery of occult ligamentous injury on MRI, despite protocol |
| June 2004 | Defined high risk criteria for patients at particular risk of cervical injury Protocol amendment- High risk patients to undergo MRI prior to spinal clearance Aspen cervical collars introduced for high risk unconscious patients |
| Nov 2004 | Installation of new 16-slice multislice CT (MSCT) in Radiology Department |
| Dec 2004 | Delayed spinal clearance due to inclusion of MRI in protocol Protocol amendment – MRI no longer used for screening Cervical spine cleared from MSCT imaging |
| June 2005 | Updated chart for documentation of spinal clearance: Spinal Assessment and Clearance Form |
| June 2005 | Introduction of The Alfred Spinal Clearance Management Protocol |
| 2006 | Installation of new 64-slice CT MSCT in Emergency and Trauma Centre |
| 2008 | Introduction of an electronic Spinal Clearance Form |

Definition of spinal injury

Major trauma patients are considered to have sustained spinal injury until proven otherwise²² and are immobilised as a precaution,²³ hence ensuring protection against possible further, catastrophic neurological deficit.

Trauma to the vertebral column may result in:

- skeletal fractures
- subluxation or dislocation injuries
- locked facet injuries
- intervertebral disc injuries
- spinal ligamentous injuries
- spinal cord injuries

Definition of spinal clearance

Spinal clearance is said to have occurred when the relevant clinicians have examined the patient physically and radiographically and have determined that no significant injury exists, at which point, immobilisation procedures are ceased.²²

Spinal clearance involves the utilisation of an assessment framework for the evaluation of the spinal status of patients considered to be at risk of spinal trauma. The assessment process concludes with either the validation of the lack of injury via the appropriate history, examination and investigation, or the diagnosis and subsequent management of an injury.

Spinal immobilisation of trauma patients is routinely carried out to minimise the potential for secondary spinal cord injury.²² Immobilisation involves the fitting of a cervical collar to minimise the risk of additional cervical spinal cord compromise, being nursed in a supine position and log rolled for pressure care to minimise potential risk to the thoracic and lumbar spine. Failure to achieve early spinal clearance predisposes the patient to increased morbidity secondary to prolonged immobilisation.

Complications of prolonged immobilisation

Delay in spinal clearance, or in diagnosis and subsequent injury management, predisposes the unconscious patient to the complications of immobilisation and resultant increase in morbidity. Potential complications include:

- Decubitus ulceration, especially cervical collar-related
- Increased intracranial pressure
- Increased need for sedation resulting in delayed weaning from ventilatory support
- Delays in percutaneous tracheostomy
- Central venous access difficulties
- Enteral feeding intolerance due to supine positioning
- Pulmonary aspiration due to supine positioning
- Deep venous thrombosis
- Increased respiratory compromise and infection

- Increased risk of cross infection due to extra staff required for position changes

Decubitus ulceration results in increased morbidity¹ and is associated with increased infection, pain and requirement for surgical procedures.²⁴ Collar-related decubitus ulceration has been found to occur in 13% of trauma intensive care patients and 3.9% of non-intensive care trauma patients at The Alfred.²⁵

Time goals for spinal clearance

Studies have found that cervical collars may remain insitu for 1.5-240 hours (Median=65 hours) and that the incidence of complications is greater in cases where the cervical collar had been on for longer than 72 hours,^{1,26} and of patients in cervical collars for longer than 5 days, 38-55% suffered collar-related decubitus ulceration.^{27,28} Cervical collars account for 24% of the total number of cases of pressure ulceration.²⁹

The aim of care of the critically ill trauma patient is to clear the spine as soon as practicable, remove the cervical collar and cease other position restrictions.

- ***Spinal clearance should occur within 72 hours post admission in order to reduce the incidence of complications of immobilisation.***³⁰ The risk of cervical collar-related decubitus ulceration increases by 66% for every 1 day increase in time to cervical spine clearance.⁴⁰

Documentation

1. Staff responsible for clearance of the cervical spine

Documentation of cervical spine clearance is required by **any one*** of the following senior medical staff after review and reporting of the appropriate cervical spine imaging by a consultant radiologist** or senior radiology registrar:

- Neurosurgeon (or senior neurosurgical registrar/fellow)
- Orthopaedic surgeon
- Intensive care physician
- Emergency physician
- Trauma surgeon

***Please note that the registrar from any of the above units may now document on the electronic Spinal Assessment and Clearance Form after consultation with a senior medical staff member (as listed above). Documentation includes the name of the senior medical staff member with whom the registrar consulted.**

Prior to the introduction of the Picture Archiving and Communication System (PACS) to the radiology department at The Alfred, two consultants (as above) were required to clear the spine and document the decision. The PACS images are able to be annotated by the radiologist, a system which now supersedes the two-signature

system. With the introduction of the "Voice Recognition" reporting system, radiologists are able to issue a report promptly after imaging, within 2 hours during business hours. The review of the images and subsequent issuing of a formal report now constitute the radiologist's "signature." One consultant from the above list (or the registrar*) is now required to document spinal clearance on the electronic ***Spinal Assessment and Clearance Form***. Please note that the previous hardcopy Spinal Status Chart: 2002, and Spinal Assessment and Clearance Form: 2006 are no longer in use.

**When injury is detected on MSCT or when abnormal neurology is present, the patient is referred to The Alfred Spine Service, contactable via the switchboard. This unit is comprised of three neurosurgical and two orthopaedic spine surgeons, one of whom will be on call.

2. Protocol spinal position restrictions

The protocol spinal position restrictions for trauma patients suspected of spinal injury include:

- supine or lateral positioning in anatomical alignment with wedge support
- head holding in collar until admission cervical MSCT is cleared of injury
- log rolling until thoracolumbar plain films are cleared
- no pillow under patient's head
- mobilisation in collar when thoracolumbar films are cleared eg. semi-recumbent positioning, etc.

These position restrictions are also outlined in the flowchart "Nursing care of the patient with potential spinal injury" (pg 16) and further information is located from page 17. The consultant or registrar from the treating unit may document "protocol position restrictions" on the position restrictions section of the electronic Spinal Assessment and Clearance Form. Please note that patients are able to be positioned laterally unless otherwise specified.

If position requirements vary from the protocol spinal position restrictions (eg. unstable pelvic fractures), documentation of specific position restrictions and rationale for the deviation from the protocol must be made on the text box in the electronic Spinal Assessment and Clearance Form by the registrar or consultant from the main treating unit.

3. Procedure post spinal clearance

Once the appropriate investigations have been completed and reviewed and reported by a consultant radiologist and another consultant as per "Staff responsible for clearance of cervical spine," the following procedure applies:

1. Documentation of spinal clearance and subsequent removal of position restrictions must be made on the electronic ***Spinal Assessment and Clearance Form*** by the consultant (or registrar after discussion with the consultant). If position restrictions pertaining to other injuries (eg. pelvic fractures) are to be continued, these should also be documented in the text box on the electronic Spinal Assessment and Clearance Form at this time.

2. The cervical collar is removed and discarded. Documentation of cervical collar removal is also made on the electronic Spinal Assessment and Clearance Form.

Indications for MRI

Cervical spine MRI may be considered if:

- The patient has signs and/or symptoms of spinal cord injury.
- The conscious trauma patient cleared of spinal injury under the NEXUS criteria (refer to pg 10) subsequently develops weakness or paraesthesia.
- The trauma patient previously cleared of spinal injury under the protocol for unconscious patients subsequently complains of weakness or paraesthesia on regaining consciousness.
- The cervical MSCT scan of the conscious or unconscious patient is indicative or suggestive of discoligamentous injury.

Possible clinically insignificant fractures^{31,39}

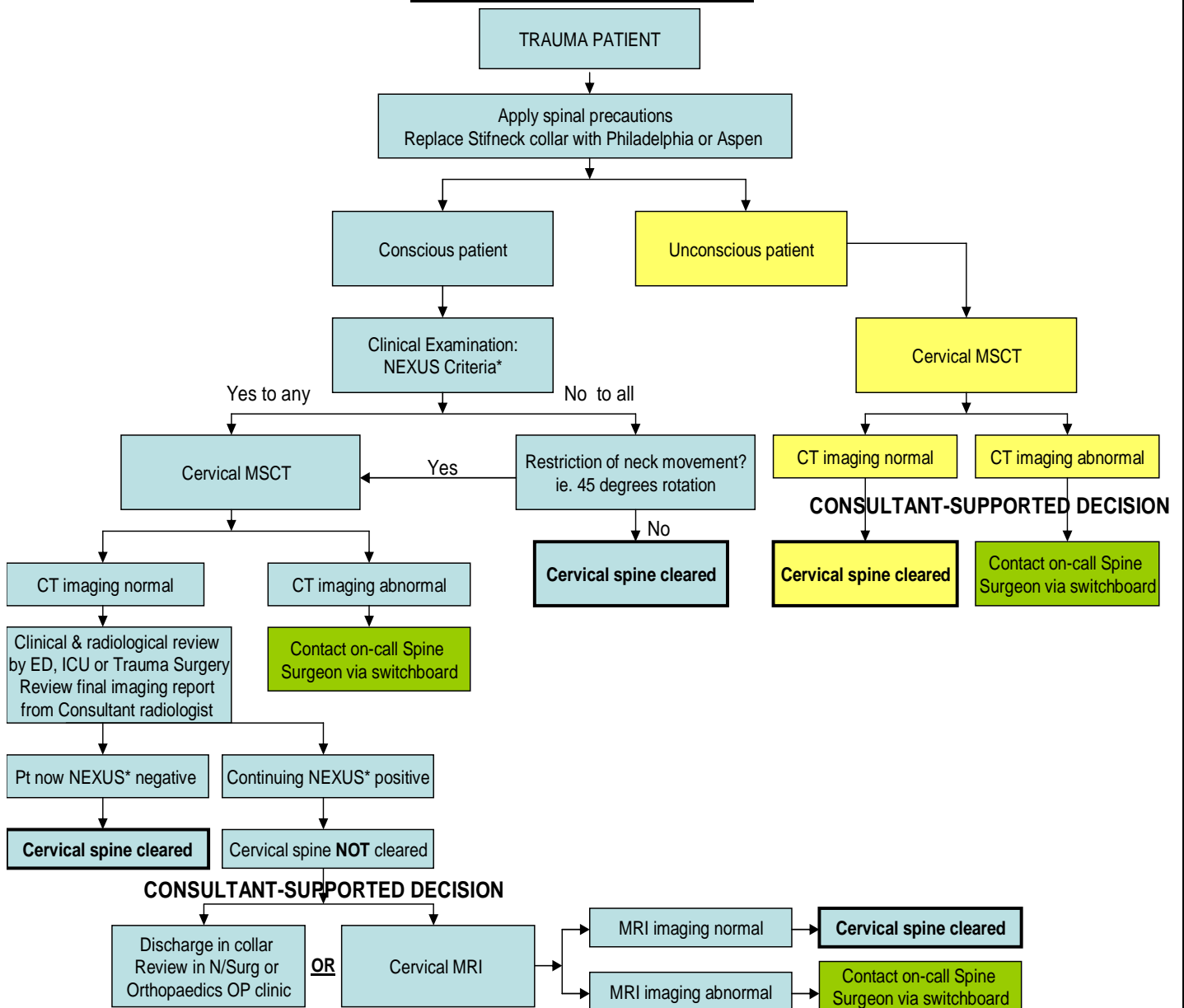
Spinal clearance will occasionally occur despite the existence of a demonstrated injury which is stable and considered to be clinically insignificant i.e. unlikely to result in harm to the patient, occurs in isolation, without evidence of other spinal injury and requires no specific treatment.

Examples of such injuries include:

- Isolated spinous process fracture not involving the lamina
- Wedge compression fracture with loss of vertebral body height of less than 25%
- Type 1 odontoid fracture
- Isolated avulsion
- End-plate fracture
- Isolated transverse process fracture not involving the facet
- Trabecular bone injury
- Osteophyte fracture, excluding corner or teardrop fractures
- Isolated avulsion without associated ligamentous injury

The decision on whether to treat the injury, however, rests with the spine surgeon on call from The Alfred Spine Service (contactable via the switchboard).

CERVICAL SPINE CLEARANCE PROTOCOL: TRAUMA PATIENTS



*NEXUS Criteria

- Midline cervical tenderness on palpation
- Focal neurological deficit (ie. paraesthesia, central cord syndrome, radiculopathy)
- Intoxication (ie. alcohol, narcotic analgesic, other drugs)
- Painful distracting injury (eg. long bone fracture, considerable burns, visceral injury)
- Altered mental status (ie. GCS<15)

NOTE:

1. Mechanism of injury is **not** one of the NEXUS criteria.
2. The protocol allows for clinical judgement and consultant input to determine spinal clearance.
3. A cervical collar should not be reapplied in a cleared spine without discussion of the rationale for reapplication with the consultant from the unit clearing the spine initially.

CERVICAL SPINE CLEARANCE MANAGEMENT PROTOCOL: CONSCIOUS PATIENTS

Cervical collars

All major trauma patients suspected of cervical spine injury will arrive in the Emergency Department (ED) in a rigid Stifneck* collar applied by the Ambulance Service. Assessment and imaging will occur while the patient has the rigid collar insitu. A Philadelphia collar will be fitted in ED if imaging is abnormal in the conscious patient or if the patient is unconscious. During business hours, an orthotist should be contacted to fit the collars (Ext. 62832 or Fax referral on 62832). Specific trauma nursing staff members in ED, ICU and the trauma wards are also qualified to fit Philadelphia collars. In the event that the patient is admitted after hours and there are no nursing staff members available who are qualified to fit the collars, the trauma or neurosurgical registrar may be contacted.

Clinical Examination

A clinical examination using the NEXUS low-risk criteria should be performed. Please note that clinical examination can only be undertaken 4 hours after the last administration of intramuscular narcotic analgesic or 4 hours after the cessation of intravenous infusion of narcotic agents.

NEXUS Low-risk criteria ³¹⁻³³

The NEXUS low-risk criteria constitute a decision tool for use in the initial assessment of conscious patients to indicate those at very low risk of cervical spine injury following blunt trauma, and therefore those who may not require radiography. Explanations regarding the NEXUS criteria are suggested as a guide only, and are subject to the interpretation of the assessing clinician.

Patients are considered to be at extremely low risk of cervical spine injury if **all** of the following criteria are fulfilled: (refer to page 11 for further information)

1. **No midline cervical spine tenderness**
2. **No focal neurologic deficit**
3. **No evidence of intoxication**
4. **No painful distracting injury**
5. **No altered mental status**

If all of the criteria are satisfied, clinical examination may then proceed. If there is no evidence of bruising, deformity or tenderness on examination, and if a full range of active movement can be performed without pain (including 45° rotation to left and right),³⁹ the cervical spine can be clinically cleared without radiographic imaging and the cervical collar can be removed.³³

Should the patient exhibit **any** of the criteria, however, **clinical examination is unreliable** and radiographic assessment of the cervical spine is advised.

NEXUS criteria³¹⁻³³

1. Midline cervical spine tenderness

Present if the patient indicates the existence of neck pain on palpation of the posterior midline neck region from the nuchal ridge to the third thoracic prominence, or palpation of any cervical spinous process.

2. Focal neurologic deficit

Motor or sensory examination indicates the presence of a focal neurologic deficit eg. segmental weakness, numbness or paraesthesia.

3. Intoxication

The patient is considered to be intoxicated if:

- the patient or an observer reports a recent history of intoxication or consumption of intoxicating substances
- evidence exists of intoxication on physical examination eg. odour of alcoholic beverage, ataxia, slurred speech, dysmetria, other cerebellar signs or any behaviour suggestive of intoxication
- tests of bodily fluids are positive for drugs or alcohol which affect mental alertness

4. Painful distracting injury

Any non-spinal related condition causing sufficient pain to distract the patient from a possible cervical spine injury. Suggestions include:

- any long bone fracture
- a visceral injury requiring surgical consultation
- extensive laceration, crush or degloving injury
- considerable burns
- any other injury producing functional impairment
- any other injury thought to impair the patient's ability to appreciate cervical spine pain

5. Altered mental status

An altered state of mental alertness can be demonstrated by:

- GCS < 15
- disorientation to time, place, person or event
- inability to recall 3 objects at 5 minutes
- delayed or inappropriate response to stimulus

Clinical spinal clearance

If all of the NEXUS criteria are negative, there is no evidence of bruising or deformity, and if a full range of active neck movement (including 45° rotation to left and right) can be performed without pain, the cervical spine can be clinically cleared ***without radiographic imaging*** and the cervical collar can be removed. Documentation must be made on the electronic Spinal Assessment and Clearance Form.

Cervical spine imaging

Should the patient exhibit any signs of cervical spine tenderness, focal neurologic deficit, evidence of intoxication, painful distracting injury or altered mental status, however, **clinical examination is unreliable** and radiographic assessment of the cervical spine is advised.

- Cervical MSCT
- MRI may be required if CT images are abnormal or if abnormal neurology is present

If imaging is abnormal, clinically significant or unstable injury will be treated by The Alfred Spine Service, via appropriate management: halothoracic brace, operative fixation or cervical collar for a period of 4-12 weeks.

Evidence of clinically insignificant injury, as designated by The Alfred Spine Service, may result in cervical spine clearance: the cervical collar will be removed, position restrictions will be ceased and documentation entered onto the electronic Spinal Assessment and Clearance Form by one of the staff designated to clear the spine:

- Neurosurgeon (or senior neurosurgical registrar/fellow)
- Orthopaedic surgeon
- Intensive care physician
- Emergency physician
- Trauma surgeon

The registrar may also document spinal clearance or treatment on the Spinal Assessment and Clearance Form after discussion with the consultant. Documentation must include the name of the senior medical staff member with whom the registrar consulted.

CERVICAL SPINE CLEARANCE MANAGEMENT PROTOCOL:

UNCONSCIOUS PATIENTS

Spinal position restrictions

All unconscious trauma patients should have protocol spinal position restrictions instituted (pg 7), including the fitting of a Philadelphia collar on admission to the Emergency Department, prior to admission to ICU. If the patient is expected to require a cervical collar for longer than 48 hours, an Aspen cervical collar should be considered.

During business hours, an orthotist should be contacted to fit Philadelphia collars (Ext 63182, fax referral on 62832 or page relevant orthotist for ED). Specific trauma nursing staff members in ED, ICU and the trauma wards are accredited to fit Philadelphia collars outside business hours. In the event that the patient is admitted after business hours and there are no nursing staff members available who are accredited to fit Philadelphia collars, the trauma or neurosurgical registrar may be contacted.

Aspen collars must be fitted by an orthotist during business hours (Fax referral on 62832 or telephone Ext 63182).

Prior to cervical spine clearance, protocol spinal position restrictions will apply, and documented as "as per protocol" in the position restrictions section of the electronic Spinal Assessment and Clearance Form. If a variation from the standard positioning regime is required, the treating unit consultant or senior registrar must document the variation and rationale in the position restrictions section of the electronic Spinal Assessment and Clearance Form.

General information

The cervical collar (Philadelphia or Aspen) must remain insitu until cervical spine clearance. The cervical collar may need to be removed for procedures eg. CVC insertion, tracheostomy insertion etc. In this case, a head holder is required to keep the head in correct anatomical alignment throughout the procedure. The collar may also need to be replaced with sandbags in a therapeutically paralysed patient who has unstable, elevated intracranial pressure.

If adequate MSCT images have been cleared and the thoracolumbar plain views are clear, the patient can be nursed in any position* and mobilised out of bed via standing or pat sliding - log rolling and head holding are no longer required. Care must be taken, however, to ensure that the patient's head remains in anatomical alignment on turning and lateral positioning.

** Pelvic fractures may prevent the patient from sitting - clarification must be obtained from the treating unit in this case.*

Spinal clearance procedure

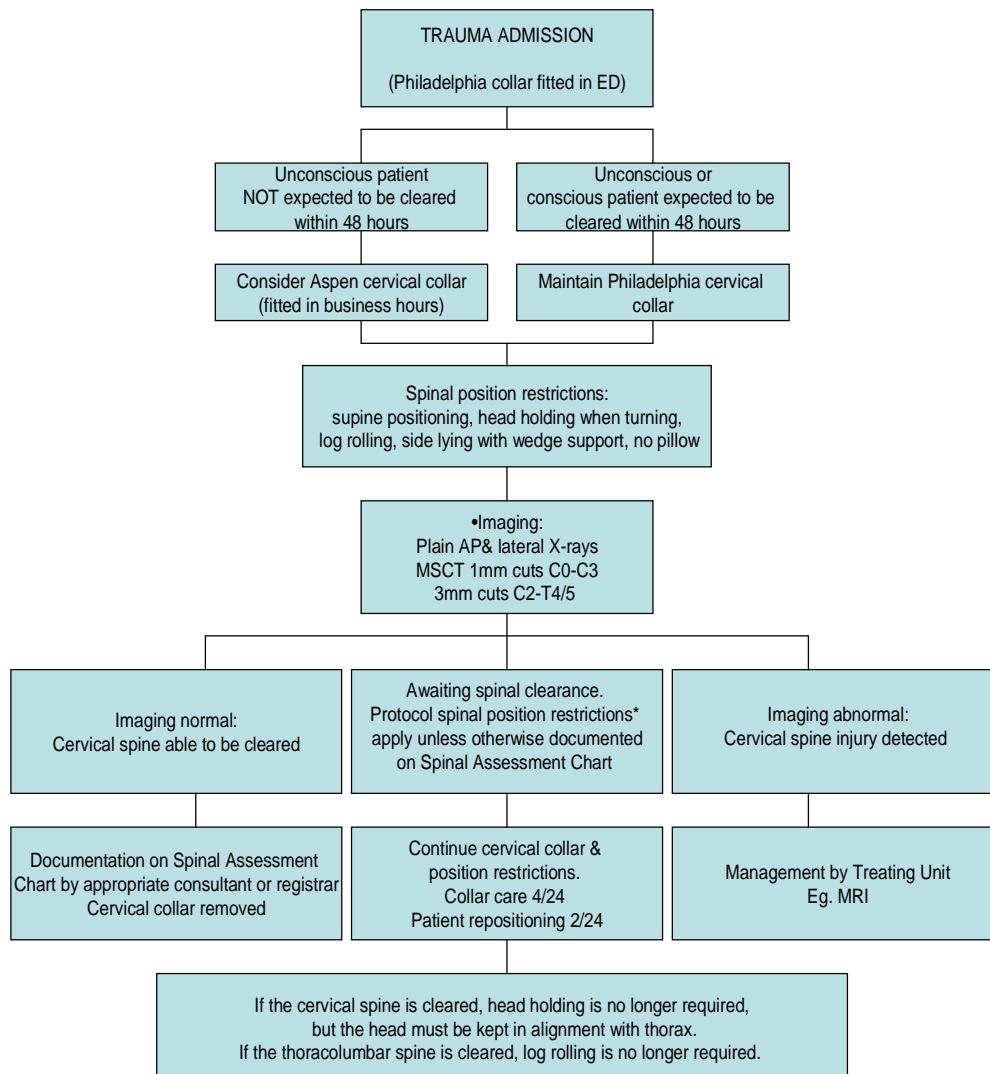
The cervical spine may be cleared if the imaging is deemed to be normal by two consultants: a consultant radiologist or senior radiology registrar via a formal, final radiology report, and one of the following:

- Neurosurgeon (or senior neurosurgical registrar/fellow)
- Orthopaedic surgeon
- Intensive Care physician
- Emergency physician
- Trauma surgeon

Spinal clearance must be documented on the electronic Spinal Assessment and Clearance Form by one of the above consultants or a registrar after discussion with the consultant. Documentation must include the name of the senior medical staff member with whom the registrar consulted.

If clinically significant injury is detected, the treatment plans must be documented on the electronic Spinal Assessment and Clearance Form.

NURSING CARE OF THE PATIENT WITH POTENTIAL SPINAL INJURY



*Protocol Spinal Position Restrictions (prior to spinal clearance):

- supine or lateral positioning in anatomical alignment (wedge support if lateral)
- head holding until admission cervical CT is cleared of injury
- log rolling until thoracolumbar plain films are cleared
- no pillow under patient's head
- mobilisation in collar when thoracolumbar films are cleared eg. semi-recumbent positioning, etc.

If position requirements vary from above restrictions, documentation and rationale for deviation from protocol must be made on the electronic Spinal Assessment and Clearance Form by the registrar or consultant from the treating unit.

- The cervical collar must be removed 4 hourly for hygiene purposes and to assess for pressure ulceration. During the procedure where the front of the collar is to be removed, the patient must be supine and flat with the head held. The collar must be replaced prior to log rolling. Once the patient is in an anatomically aligned lateral position and the head holder is ready, the back of the collar may be removed to assess the occipital region.
- Head holding is no longer required when the cervical spine is cleared, but the patient must be kept in correct anatomical alignment.
- Log rolling is no longer required when the thoracolumbar plain films are cleared of injury.

NURSING CARE OF THE PATIENT WITH POTENTIAL SPINAL INJURY

All major trauma patients are considered to have potentially sustained spinal trauma and are immobilised as a precaution to prevent possible further spinal injury. The protocol spinal position restrictions include the application of a cervical collar, supine positioning without a pillow, log rolling, lateral positioning in anatomical alignment with wedge pillow and head holding for turning (pg 7).

Aims of care

The main aims of care for trauma patients with potential spinal injuries are:

1. Prevention of possible further spinal injury
 - Application of cervical collar
 - Instigation of protocol spinal position restrictions
2. Prevention of complications of immobilisation eg. pressure ulcers, pneumonia
 - Strict collar care
 - Frequent turning
 - Upright positioning as soon as possible
3. Early spinal clearance
 - Timely completion of radiographic procedures
 - Adequate communication at bedside
 - Appropriate documentation

Immobilisation procedures: Spinal position restrictions

- A. Head holding
- B. Log rolling
- C. Lateral Positioning (side lying)

A. Head holding

Prior to spinal clearance, the patient's head must be supported during position changes, collar care and under any circumstances in which the collar is removed eg. procedures such as central venous catheterisation etc.

Once the cervical spine is clear, head holding is no longer required. However, care must be taken to ensure that the patient's head remains in anatomical alignment on turning and lateral positioning.

Head holding with collar insitu

Head holding may be performed in a number of ways on condition that the adopted method stabilises the patient's head in a position of correct anatomical alignment and prevents flexion, extension and lateral tilting during the process. The patient's head can be held from the top of the bed (Fig 1) or from the side (Fig 2), depending upon equipment constraints and the preference of the staff member designated to head hold. (Please note that in ED, head holding from the top of the bed is preferred).

The two recommended methods for head holding are outlined as follows:

1. Explain the procedure to the patient regardless of conscious state and ask the patient to lie still and to refrain from assisting.
2. Ensure that the collar is well fitting prior to commencement.
3. If applicable, ensure that devices such as indwelling catheters, intercostal catheters, ventilator tubing etc. are repositioned to prevent overextension and possible dislodgement during repositioning.
4. The designated head holder stands at the head or side of the bed with the bed at a comfortable height ie. above waist height.
5. For head holding from the top of the bed:

One hand is placed around the patient's jaw with fingers spread (for a ventilated patient, the endotracheal tube may be stabilised with the thumb and index finger). The forearm is used to stabilise the lateral aspect of the head. The other hand is positioned under the patient's neck with fingers spread. Firm pressure must be applied to restrict the possibility of flexion, extension and lateral tilting (Fig 1).



Fig 1

For head holding from the side of the bed:

The head holder stands on the side of the bed towards which the patient will be rolled. One hand is placed under the patient's neck with fingers spread. The other hand is placed over the patient's jaw (for a ventilated patient, the endotracheal tube may be stabilised with the thumb and index finger). Firm pressure must be applied to restrict the possibility of flexion, extension and lateral tilting (Fig 2).



Fig 2

6. The head holder is in charge of the procedure and must ensure that all other staff members are in correct position and are ready to commence (refer to Log Rolling, p 21). If the patient is to be turned or repositioned, the head holder may call "on my count, one, two and three." The turning will occur on "three". On completion of the procedure, if the patient is to be returned to the supine position, the head holder will again direct the procedure. For example, "back, one, two and three."
7. The turning must occur in one smooth action, with the patient's head and body remaining in anatomical alignment at all times.
8. If the patient is to remain in a lateral position, the head holder must continue to hold the head until the primary nurse has positioned padding beneath the patient's head to prevent lateral tilting and to ensure correct alignment.
9. If the patient is to return to the supine position, the head holder must continue to hold the head until the patient is in correct anatomical alignment, directing assistants to adjust position until alignment is achieved.

Head holding without collar

Under some circumstances, a cervical collar will be removed temporarily (eg. for the insertion of a central venous catheter) or contraindicated (eg. in the case of suspected collar-related increase in jugular venous pressure leading to elevated intracranial pressure). In these cases, the head must be held until completion of the procedure and reapplication of the collar, or in therapeutically paralysed patients, until the patient's head is safely immobilised using sandbags. ***Do not turn the patient without first reapplying the collar.***

A recommended method is outlined as follows:

1. Follow Steps 1 and 4 as per "Head holding with collar insitu" pg 17.
2. The bed is moved to the horizontal position ie. no tilt
3. The head holder's hands are placed over the patient's shoulders with thumbs superior and splayed fingers inferior (beneath the shoulders). The lateral aspects of the patient's head can be supported with the head holder's forearms, with firm pressure applied to prevent movement. Alternatively, if access to the neck is specifically required for a procedure, the head holder's hands may be positioned directly onto the lateral aspects of the patient's head over the ears. As this alternate method is less stable, care must be taken to ensure that the patient is either fully co-operative or adequately sedated.
4. The head holder must continue to support the patient's head until the cervical collar has been reapplied or the sandbags are in place.

B. Log rolling

The log rolling procedure is implemented prior to thoracolumbar spinal clearance for examination of the patient's back, cervical collar care, pressure care, to facilitate chest physiotherapy etc. The main principles underlying the log rolling procedure are the strict adherence to correct anatomical alignment in order to prevent the possibility of further, catastrophic neurologic injury and the prevention of pressure sores.

1. Four staff members are required to assist in this procedure:
 - 1 to hold the patient's head and direct the procedure (as per pg 17)
 - 2 to support the chest, abdomen and lower limbs
 - 1 to carry out the planned activity ie. pressure care etc.

In some cases, (eg. morbidly obese patients or patients with lower limb traction) three assistants may be required to support the chest, abdomen and lower limbs).

2. Explain the procedure to the patient regardless of conscious state and ask the patient to lie still and to refrain from assisting.
3. Ensure that the collar is well fitting prior to commencement.

4. If applicable, ensure that devices such as indwelling catheters, intercostal catheters, ventilator tubing etc. are repositioned to prevent overextension and possible dislodgement during repositioning.
5. If the patient is intubated or has a tracheostomy tube, airway suctioning prior to log rolling is suggested, to prevent coughing which may cause possible anatomical malalignment during the log rolling procedure.
6. The bed must be positioned at a suitable height for the head holder and assistants.
7. The patient must be supine and anatomically aligned prior to commencement of log rolling procedure.
8. The patient's proximal arm must be adducted slightly to avoid rolling onto monitoring devices eg. arterial or peripheral intravenous lines. The patient's distal arm should be extended in alignment with the thorax and abdomen (Fig 3), or bent over the patient's chest if appropriate ie. if the relevant arm is uninjured. A pillow should be placed between the patient's legs.
9. Assistant 1, the assistant supporting the patient's upper body, places one hand over the patient's shoulder to support the posterior chest area, and the other hand around the patient's hips (Fig 3).
10. Assistant 2, the assistant supporting the patient's abdomen and lower limbs, overlaps with assistant 1 to place one hand under the patient's back, and the other hand over the patient's thighs (Fig 3).



Fig 3

11. On direction from the head holder (as per pg 17), the patient is turned in anatomical alignment in one smooth action (Fig 4).



Fig 4

(Note: spinal alignment as indicated by black line)

12. On completion of the planned activity, the head holder will direct the assistants to either return the patient to the supine position or to support the patient in a lateral position with wedge pillows. The patient must be left in correct anatomical alignment.

Log rolling is no longer required if the thoracolumbar plain films are clear.

C. Lateral Positioning (Side lying)

The patient may be positioned laterally prior to spinal clearance to assist with chest physiotherapy and reduction of collar-related occipital pressure. Exceptions to this rule may include unstable thoracic, lumbar or pelvic fractures. In this case, clarification of position restrictions needs to be obtained from the treating unit and documented on the electronic Spinal Assessment and Clearance Form.

The patient must be well supported in the lateral position using wedges. The patient's head and body must be kept in anatomical alignment at all times. Padding may be required between the cervical collar and the bed to prevent lateral tilting of the patient's head.

CERVICAL COLLARS

Introduction

Major trauma patients are considered to have sustained spinal trauma until proven otherwise and are immobilised as a precaution. Injuries to the cervical spine occur in 2-6.6% of major trauma patients,¹⁻⁷ and the existence of head injury increases the incidence of cervical spine injury to 8-10%.^{2,6,8} The most common site of cervical spine injury is from the occiput to C3.^{7,8,35} Missed or delayed diagnosis of cervical spine injury occurs in 4-8% of patients, whilst for the whole spine, missed or delayed diagnosis results in ten times the incidence of secondary neurological deficit compared with patients who have correct diagnosis initially.⁹ Of the patients with missed or delayed diagnosis of cervical spine injury, 70% had altered levels of consciousness.¹⁰ The potential physical, social and economic issues associated with missing/delaying diagnosis are far-reaching with the lifetime care of a quadriplegic patient estimated to cost \$1-5 million.³⁶

The potential spinal patient must be immobilised: fitted with a cervical collar to minimise the risk of additional cervical spinal cord compromise, nursed flat or laterally in anatomical alignment and log rolled for pressure care to minimise potential risk to thoracic and lumbar spine. The cervical collar restricts flexion, extension, rotation and lateral tilting of the neck.³⁷ The cervical collar (Philadelphia or Aspen) replaces the rigid temporary collar applied at the trauma scene, preferably within 4 hours of admission. The cervical collar is fitted by an orthotist or by suitably qualified E & TC, ICU or trauma nursing staff. The clearance of the cervical, thoracic and lumbar spine in the trauma patient enables the removal of such position and mobilisation restrictions.

Causes of collar-related pressure ulceration

- Collar-related pressure ulcers are formed when unrelieved pressure on poorly oxygenated tissue results in tissue ischaemia.
- Supine patients are particularly at risk of pressure ulcers over bony prominences, particularly the occiput. Other susceptible sites include the chin, mandible, ears, laryngeal prominence, sternum, clavicles and shoulders.
- Shearing forces may also contribute to ulcer formation ie. an ill-fitting collar may cause friction between the skin and collar surface.
- The presence of moisture eg. sweat, blood etc may soften the skin, causing maceration resulting in a predisposition to ulceration.
- The presence of matted hair or foreign bodies (eg. road grime) beneath the collar may result in areas of uneven pressure.
- Signs of pressure ulcer formation include reddened skin, particularly over bony prominences, 'boggy' areas, blisters and grazing.

PHILADELPHIA CERVICAL COLLAR GUIDELINES

Please note that Philadelphia collars are fitted by the Orthotic Department during business hours and by accredited trauma nursing staff or the trauma or neurosurgical registrar at other times. To complete the accreditation course, experienced trauma nursing staff members are required to contact the manager of orthotics on Ext 3182.

Contents

- A. Description
- B. Advantages and disadvantages
- C. Assessment of correct fit
- D. Cleaning and drying
- E. Reapplication of the collar following neck care
- F. Troubleshooting
- G. Collar Modification
- H. Action required if a pressure ulcer develops

A. Description

The Philadelphia cervical collar is a two-piece blush-coloured reinforced closed cell moulded foam collar. The anterior and posterior foam segments are linked with wide velcro bands. Cotton jersey knit liners are available from the Orthotic Department for patient comfort and moisture absorption should a rash develop.

B. Advantages and disadvantages

Advantages:

The purpose of the collar is to immobilise the neck in acute care and rehabilitation settings. The moulded design allows for ease of fitting in both supine and ambulant patients and cleaning is straightforward. The collar has been shown to be of particular benefit in terms of adequate immobilisation and cost containment in short term use (up to 48 hours post admission) in trauma patients.

Disadvantages:

The Philadelphia collar has been shown to exert a statistically significant amount of pressure, above capillary closing pressure, on the occiput, mandible and chin.³⁸ As a result, use of the collar for periods longer than 48-72 hours has been associated with increased pressure ulceration rates.^{1,29} Recent evidence suggests that the risk of cervical collar-related decubitus ulceration increases by 66% for every 1 day increase in time to cervical spine clearance.⁴⁰

C. Assessment of correct fit

The collar must be checked daily to ensure that correct fit is maintained in the setting of fluctuating neck and facial swelling. Do not use a pillow beneath the collar prior to cervical spine clearance.

(Exception: Patients who have been diagnosed with cervical spine injury and are being treated in a cervical collar for 4-6 weeks may have a pillow beneath the collar).

1. Chin: The patient's chin should be sitting in the moulded chin support of the anterior section. To check, roll back the lip of the chin section.
2. Shoulders and Back: The posterior section of the collar should be centred so that it is symmetrical, not rotated and the velcro straps are even (Fig 5). The centre of the posterior section should be aligned with the patient's spine. The velcro strap should be positioned midway between the ears and shoulders. Ensure that the flared rim is in even contact with the patient's scapulae and is not inadvertently folded underneath the posterior section.

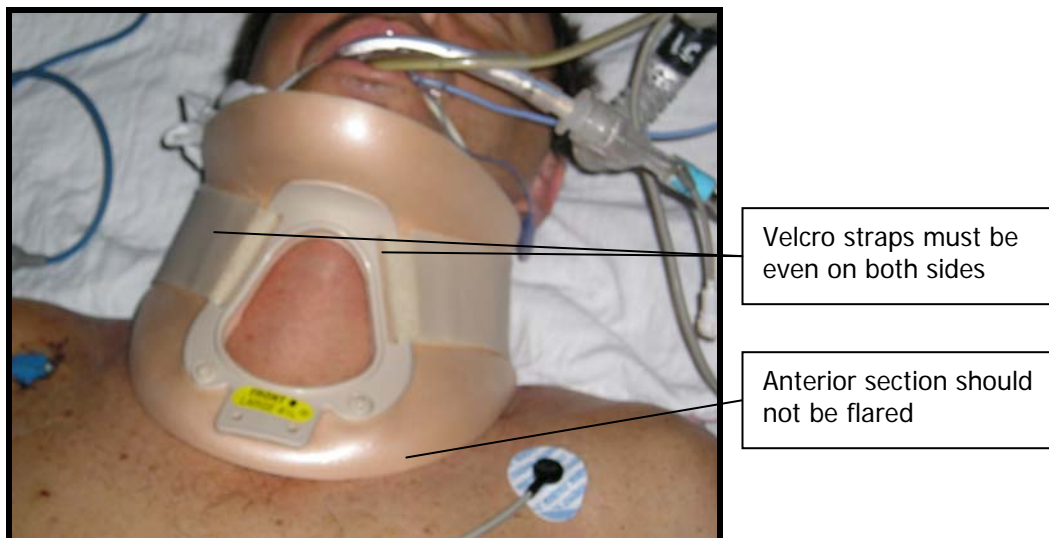


Fig 5

3. Chest: The bottom of the anterior section should sit on the chest, and the rim should not be flared or flattened. If so, the collar may be too long. If the chin is in the chin support and the collar does not make contact with the chest, the anterior section may be too short.
4. The anterior section must overlap the posterior section (Note: opposite to Aspen collar).
5. Should signs of pressure develop, the Orthotic Department is able to perform significant collar modification or refitting if required, and the orthotist should be contacted for advice. Slight collar modification may be performed by the nursing staff (refer to section on collar modification, pg 26).

D. Cleaning and drying

1. Every 4 hours, the collar should be removed to inspect the neck for signs of pressure. The patient's head and neck must be held in anatomical alignment by another staff member until the cervical collar is replaced (refer to section on head holding, pg 17).
2. The collar should be washed in warm, soapy water and dried with a towel. The closed cell foam does not absorb water. Heavy soiling which is unable to be removed may necessitate a replacement collar.
3. The patient's skin must be washed and dried thoroughly and inspected for signs of pressure. The collar must be replaced prior to log rolling for removal of the posterior section and inspection of the occiput.
4. The patient's hair may be washed with the head held in anatomical alignment. Matted or knotted hair or road grime beneath the collar may cause increased skin pressure, therefore hair must be combed or trimmed to prevent this occurrence. Hair may need to be clipped beneath the collar around wounds and to view the occiput.

E. Reapplication of the collar following neck care

Posterior section

1. Place the posterior section on the bed adjacent to the crevice of the patient's neck. Fold the velcro strap in half under the posterior section of the collar to protect the patient and place one hand on the centre of the inside of the posterior section.
2. Press down on the posterior section, compressing the mattress, and slide under the patient's neck until the collar is centred. Ensure that the collar has not doubled over and is sitting smoothly against the patient's skin. Using the side sections as a guide, ensure that the collar is centred properly – the head holder may be in a better position to ascertain the degree of alignment of the collar.

Anterior section

1. Place the anterior section on the patient's neck, ensuring that the chin is located in the moulded chin support. The anterior section must overlap the posterior section (Note: opposite to the Aspen collar which has the posterior section over the anterior section). The overlap should be at least 1.5-2cm.
2. Attach the posterior velcro straps firmly to the anterior velcro section. If the collar is centred correctly, the velcro straps should be symmetrical. If one strap appears to be longer than the other, the posterior section of the collar will need to be rotated to become centred correctly.

F. Troubleshooting

1. Swelling

Post trauma oedema of the patient's head and neck will sometimes cause a previously well-fitting collar to become tight. If occurring during business hours, please refer the situation to the Orthotic Department. If outside business hours, modifications may be made to the collar as per Collar Modification (below).

2. Redness

Isolated areas of redness may require modification. Regular position changes to the left and right lateral positions must be made to reduce occipital pressure. If other areas of the collar are creating pressure, contact the Orthotic Department for advice. **DO NOT PLACE ANY PADDING BETWEEN THE COLLAR AND THE PATIENT'S SKIN AS THIS MAY INCREASE PRESSURE.**

3. Neck Moisture

Excessive moisture from secretions, sweat or blood beneath the collar will require more frequent collar care. Also, cotton liners for the Philadelphia collars are available from the Orthotic Department.

4. Elevated ICP

Persistently elevated ICP may be partly attributable to the cervical collar. If this is suspected and the patient is heavily sedated or chemically paralysed, the collar may be removed while the patient is in the supine position and sandbags positioned in place of the collar to stabilise the head.

5. Rashes

Allergic reactions are uncommon with the Philadelphia collar and must be referred to the orthotist if they occur. Heat rashes are more common and may be alleviated with more frequent collar care to keep the area dry. Persistent heat rashes may require the orthotist's advice.

G. Collar Modification

- The patient's head must be held in anatomical alignment whilst collar modifications are being made (Refer to section on head holding, page 17).
- Collar modification should be avoided if possible, as it may result in reduction of the collar stability. However, if the collar fit is appropriate, but pressure on isolated areas is causing reddening, some modification may be necessary. The Orthotic Department should be contacted during the hours of 0800-1630 Monday to Friday, and Philadelphia collar-accredited nursing staff should be approached for advice at other times.

The following modifications should only be made by staff members who are accredited to fit Philadelphia collars:

- A scalpel blade should be used to trim troublesome areas. On the back section, only the lateral sides may be trimmed; the superior and inferior borders of the back section should not be modified as this may affect the stability of the collar. *Trimming should never be deep enough to expose the rigid plastic collar supports.*
- If the collar is in contact with the larynx, a small, symmetrical channel may be carved to reduce pressure.
- A small modification can be made to alleviate pressure over the clavicle or around central venous catheter sites.
- The orthotist may suggest occipital modifications which are made on specific equipment in the Orthotic Department. The occipital area of the collar back may be ground down to relieve pressure and buffed to create a smooth surface.

H. Action required if a pressure ulcer develops

- Contact the orthotist to review or modify the collar (Fax referral to 62832 or call ext 63182).
- Dress the ulcer according to the ward or unit guidelines.
- Notify the treating unit (Trauma or Neurosurgery) as open pressure ulcers will often preclude surgery. If the patient is an ICU inpatient, notify the ICU registrar.
- Document the ulcer's existence and proposed treatment in the nursing care plan and in the progress notes.

ASPEN CERVICAL COLLAR GUIDELINES

Contents

- A. Description
- B. Perceived advantages and disadvantages
- C. Assessment of correct fit
- D. Cleaning and drying
- E. Reapplication of collar following neck care
 - Reapplication of foam pads
 - Reapplication of collar
 - supine patient
 - ambulant patient
- F. Trouble Shooting

A. Description

The Aspen cervical collar is a two-piece flexible plastic collar with removable, cotton-lined grey foam padding. A spare set of pads is supplied with the collar. The thin, flexible nature of the posterior section reduces the potential for occipital pressure ulcers.

B. Advantages and Disadvantages

Advantages:

The foam padding allows for cushioning of bony prominences and removal of moisture from potential sites of decubitus ulceration. The thin, flexible nature of the posterior section reduces the potential for occipital pressure ulcer development. The decision was, therefore, made to institute the use of Aspen collars at The Alfred for the high risk groups of unconscious trauma patients who are not expected to be cleared of spinal injury within 48 hours of admission.

As a result, the Aspen collar has been utilised for patients who are expected to be wearing a cervical orthosis for greater than 48 hours, and has been shown to be of particular benefit in the unconscious intensive care population at The Alfred in terms of significant pressure ulcer reduction.

Disadvantages:

The Aspen collar is a more complex orthosis to fit and requires liners to be changed and washed. The collar is also expensive; approximately 4 times the cost of a Philadelphia collar.

C. Assessment of correct fit (Fig 6 and 7)

1. The posterior section of the collar should overlap the front (opposite to the Philadelphia collar where the front overlaps the back). The patient's chin should be level with the anterior plastic edge of the chin piece and should not "fall" into the collar (Fig 6).
2. The posterior edge of the chin piece should not be in contact with the patient's neck. If this is the case, resizing by an orthotist may be required (Fig 7).
3. The posterior section of the collar should be positioned so that the grey velcro straps are level with the velcro webbing on the collar front (Fig 6).
4. The grey velcro straps should pass midway between the patient's ears and shoulders and should not be in contact with the earlobes. The velcro straps should be even on both sides.
5. The velcro straps should be pulled to secure a snug fit with no gapping between the collar and the patient's neck. The collar should be in full circumferential contact with the neck.
6. The back of the collar must overlap the front by at least 2 cm.

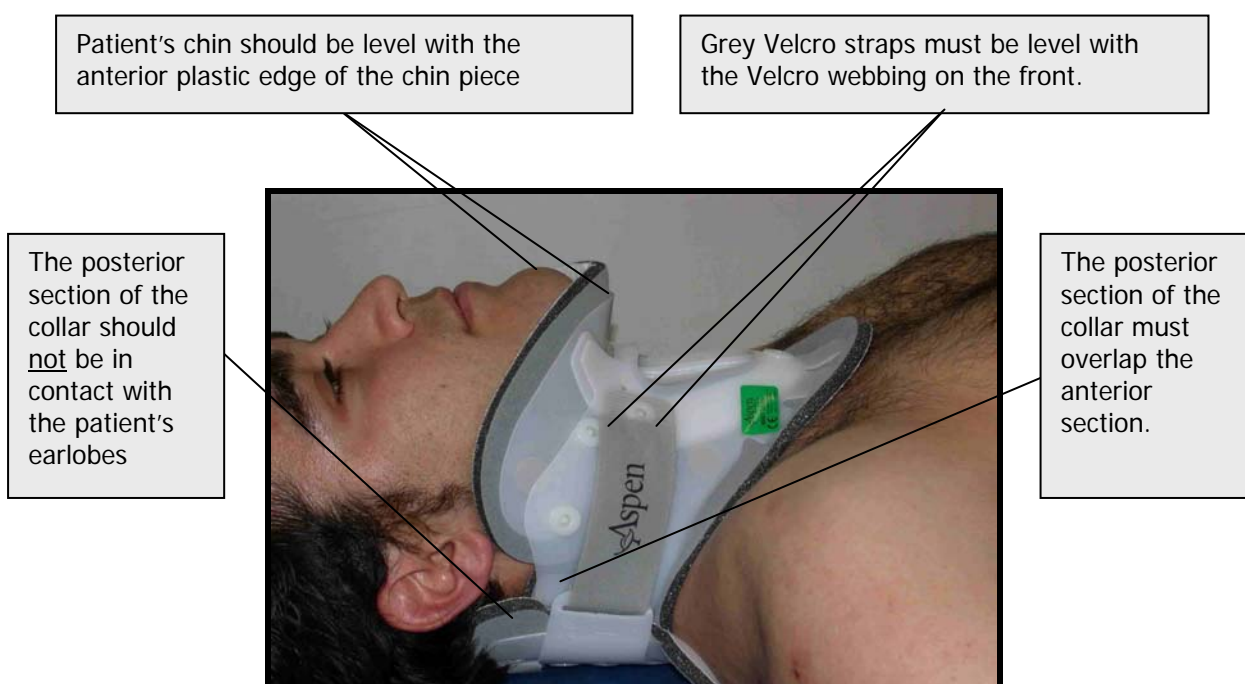
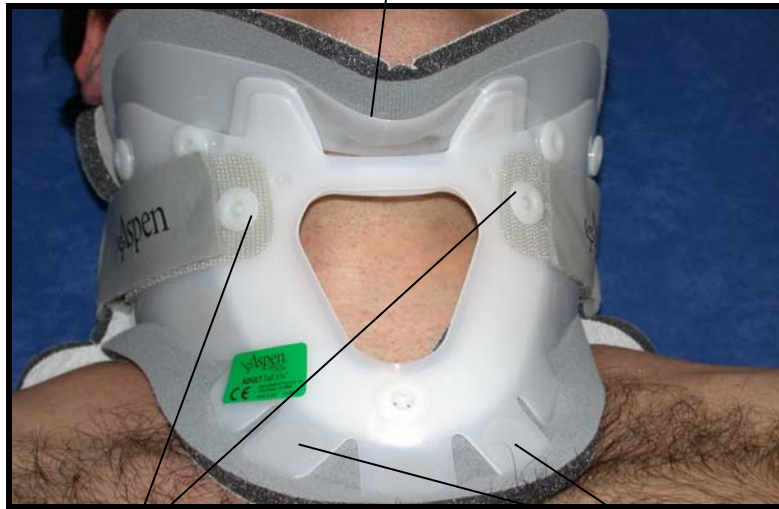


Fig 6

The posterior edge of the chin piece should not be in contact with the patient's neck



Velcro straps should be pulled so that the collar fits snugly. The velcro straps should be even on both sides

Front and back plastic lugs are able to be bent upwards to reduce pressure. The outermost lugs can be trimmed if necessary

Fig 7

D. Cleaning and drying

1. Every 4 hours, the collar should be removed to inspect the neck for signs of pressure, and the grey foam pads replaced if soiled and damp.
The patient's head and neck must be held in anatomical alignment by another staff member until the collar is replaced (refer to Head Holding, pg 17).
2. Remove the collar from the patient by unfastening the velcro straps, lifting off the anterior section of the collar and sliding the posterior section out from under the patient's neck.
3. Peel the grey foam pads from the anterior section away from the velcro dots.
4. Remove the grey foam pads from the posterior section by pulling the velcro straps through the plastic slots and then peeling the pads from the velcro dots.
5. Wash the pads in soap and water (as with the blue tracheostomy neck tapes). Pads may require scrubbing if heavily soiled. Roll pads in a towel to remove excess moisture and lie on a towel to dry. Pads will dry in 3-4 hours if excess moisture is removed. Use replacement pads during the drying time.

6. Change pads 8 hourly or more frequently if damp or soiled (one of the major benefits of the Aspen collar is the absorbency of moisture from the skin over potential pressure areas).
7. Wipe the plastic collar casing with soapy water and dry well prior to reattaching pads.
8. The patient's skin must be washed and dried thoroughly and inspected for signs of pressure. The collar must be replaced prior to log rolling for removal of the posterior section and inspection of the occiput.
9. The patient's hair may be washed with the head held in anatomical alignment. Matted or knotted hair or road grime beneath the collar may cause increased skin pressure, therefore hair must be combed or trimmed to prevent this occurrence. Hair may need to be clipped beneath the collar around wounds and to view the occiput.
10. Do not dispose of the grey foam pads until the patient no longer requires the Aspen collar. The plastic collar casing is not reusable by further patients as a result of the potential for cross-infection via the velcro dots, which cannot be adequately cleaned. The plastic shell and pads must be discarded when the patient no longer requires an Aspen collar.

E. Reapplication of Aspen collar following neck care

Reapplication of foam pads

1. Attach the pads with the grey side to the collar and the white side uppermost (white side to the patient). To attach the back pad, thread the velcro straps from the plastic back through the side slots in the foam pad and pull through. Press the velcro dots to ensure that the pad is firmly adhered. Thread the velcro straps through the side slots in the plastic back panel (Fig 8)

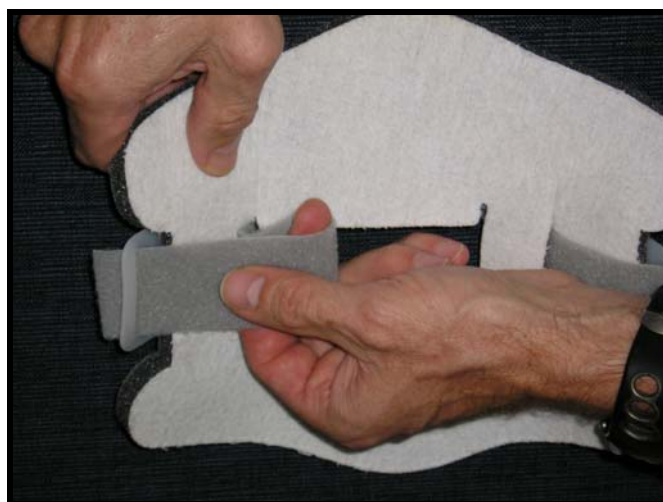


Fig 8

2. To attach the chin pad, fold the pad in half and align with the centre chin velcro dot on the plastic anterior section (Fig 9), ensuring a 1cm overlap of foam pad. Attach the lateral parts of the pad to the outer velcro dots, allowing even overlap of the pad over the plastic edge. Repeat the process with the lower front pad, allowing at least 1 cm overlap below the plastic lugs. Ensure that all edges of the plastic shell are covered by the foam pads.



Fig 9

Reapplication of collar

Posterior section

1. Roll the posterior section (Fig 10) to bend the plastic into a U shape to fit the patient's neck. Arrows indicating "UP" are found on the lateral sides of the plastic, and the posterior section should be fitted so that the manufacturer's information in the lower centre plastic panel is positioned at the bottom.



Fig 10

2. Fold the velcro strap over the foam pad. Place the posterior section of the collar under the crevice of the patient's neck at the side. Press down on the posterior section with one hand and slide the collar under the patient's neck with the other hand, compressing the mattress, until the posterior section is centred and the velcro straps are even on both sides. The velcro straps should be situated at the mid-point between the ear and the shoulder.

Anterior section

1. Bend the sides of the anterior section outwards. Flatten the chin section by gripping with thumbs on the distal border and fingers over the chin piece then squeezing together (Fig 11).



Fig 11

2. Position the chin section directly under patient's chin while squeezing the collar. The plastic must NOT extend beyond the patient's chin. Hold the chin section in position while lowering the distal border of the collar onto the chest (Fig 12).



Fig 12

3. While continuing to hold the collar in position, push the sides up and over the shoulders and wrap around the neck snugly (Fig 13).



Fig 13

4. Pull the velcro from the posterior section laterally, ensure that the side portion of the anterior section is wrapped around the neck as far as possible and that the position of the chin section is maintained (Fig 14). Attach the velcro strap over the anterior section (note: opposite to Philadelphia Collar). Repeat with the opposite side. Adjust the straps one at a time until:
 - Velcro straps are even
 - The collar is firmly fitting
 - The back overlaps the front by at least 2 cm



Fig 14

F. Troubleshooting

- Areas to monitor for redness include the occiput, chin, clavicles, scapulae and mandible.
- Change foam pads more frequently to ensure potential pressure areas are kept dry.
- Ensure that the plastic frame of the collar is never in contact with the patient's skin.
- Front and back plastic lugs are able to be bent upwards to reduce pressure without reducing the stability of the collar (Fig 7). The outermost plastic lugs can be trimmed to a smooth shape if required.
- For occipital redness, the occipital support strap (Fig 6) on the back panel can be tightened to reduce occipital pressure. This is most effective in ambulant patients and clinical practice at The Alfred has shown that benefit can also be gained in supine patients. A short back panel, which sits below the occipital area, is available.

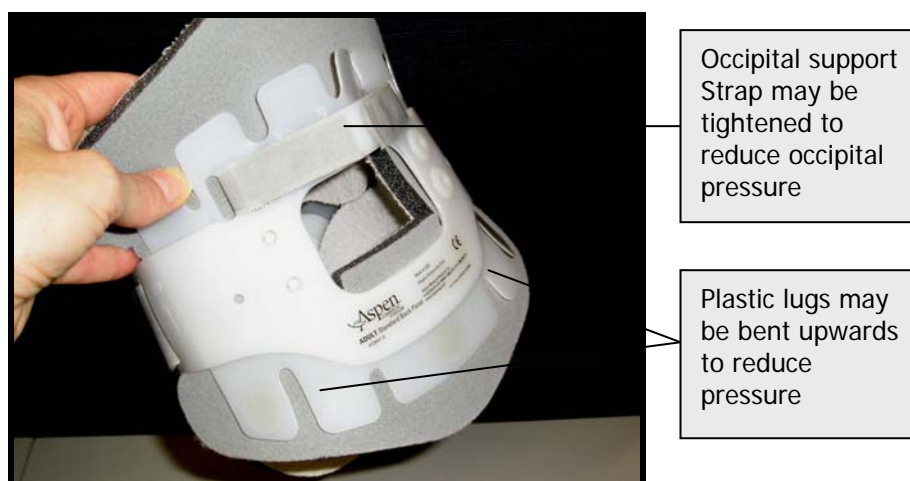


Fig 15

- Continued skin redness despite troubleshooting may indicate the need for reassessment by the orthotics staff. The development of any pressure areas should be referred to the Orthotic Department who may offer collar adjustment/refitting to alleviate the pressure.

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Appendix 1: Electronic Spinal Assessment and Clearance Form, View 1

Spinal Assessment and Clearance - ACKLAND, HELEN MARGARET

*Performed on: 04/12/2009 1600 By: Ackland, Helen Margaret

Spinal Assessment and Clearance

Glascow Coma Scale

Eye Opening:

Verbal Response:

Motor Response:

GCS Score:

Additional Criteria if GCS=15

Remembers 3 Objects in 5 Minutes:

Response to External Stimuli:

Is the patient unconscious and unable to be assessed?:

NEXUS Criteria

1. Midline cervical tenderness on palpation?
2. Focal neurologic deficit?
3. Intoxication?
4. Painful distracting injury?
5. Altered mental status ie. GCS<15?

If yes to any, immobilisation and imaging required.
If yes to any, neck movement assessment contraindicated.

Midline Cervical Tenderness on Palpation

Yes No

Focal Neurologic Deficit

Paraesthesia Other

Loss of Sensation None

Loss of Function

Painful Distracting Injury

Long Bone Fracture

Visceral Injury Requiring Surgical Consult

Large Laceration

Degloving Injury

Crush Injury

Large Burns

Other Injury Producing Acute Functional Impairment

None

Intoxication

Patient / Observer Stated

Narcotic Analgesic Within Last 4 hrs

Odour of Alcoholic Beverage

Slurred Speech

Ataxia

Dysmetria

Body Secretions Positive for Drugs eg BAL

Other Cerebellar Findings

None

Neck Movement Assessment Do Not complete Neck Movement Assessment if yes to any NEXUS criteria

Lateral Rotation of Neck: 45 deg left and right, over shoulders

Lateral Flexion of Neck: Over left and right shoulders

Forward Flexion of Neck:

Backward Extension of Neck:

Protocol Position Restrictions

In Progress

Appendix 1 Electronic Spinal Assessment and Clearance Form, View 2

Spinal Assessment and Clearance - ACKLAND, HELEN MARGARET
By: Ackland, Helen Margaret

*Performed on: 04/12/2009 1600

| | | |
|---|---|---|
| <p>Midline Cervical Tenderness on Palpation</p> <p><input type="radio"/> Yes <input type="radio"/> No</p> | <p>Focal Neurologic Deficit</p> <p><input type="checkbox"/> Paraesthesia <input type="checkbox"/> Other <input type="checkbox"/> Loss of Sensation <input type="checkbox"/> None <input type="checkbox"/> Loss of Function</p> | <p>Painful Distracting Injury</p> <p><input type="checkbox"/> Long Bone Fracture <input type="checkbox"/> Visceral Injury Requiring Surgical Consult <input type="checkbox"/> Large Laceration <input type="checkbox"/> Degloving Injury <input type="checkbox"/> Crush Injury <input type="checkbox"/> Large Burns <input type="checkbox"/> Other Injury Producing Acute Functional Impairment <input type="checkbox"/> None</p> |
|---|---|---|

Intoxication

| | |
|---|--|
| <input type="checkbox"/> Patient / Observer Stated | <input type="checkbox"/> Dysmetria |
| <input type="checkbox"/> Narcotic Analgesic Within Last 4 hrs | <input type="checkbox"/> Body Secretions Positive for Drugs eg BAL |
| <input type="checkbox"/> Odour of Alcoholic Beverage | <input type="checkbox"/> Other Cerebellar Findings |
| <input type="checkbox"/> Slurred Speech | <input type="checkbox"/> None |
| <input type="checkbox"/> Ataxia | |

Neck Movement Assessment Yes **Do Not** complete Neck Movement Assessment if yes to any NEXUS criteria

| | | | |
|--|--|--|--|
| Lateral Rotation of Neck | Lateral Flexion of Neck | Forward Flexion of Neck | Backward Extension of Neck |
| Within Normal Limits <input type="text" value="Within Normal Limits"/> | Within Normal Limits <input type="text" value="Within Normal Limits"/> | Not Within Normal Limits <input type="text" value="Not Within Normal Limits"/> | Not Within Normal Limits <input type="text" value="Not Within Normal Limits"/> |
| 45 deg left and right, over shoulders | Over left and right shoulders | | |

| | | |
|--|---|--|
| Cervical Collar Type | Cervical Collar Fitted | Protocol Position Restrictions |
| Philadelphia <input type="text" value="Philadelphia"/> | 03/12/2009 1603 | Head Hold in Collar Log Roll No Pillow Under Head Lateral Position in Alignment Mobilise in Collar when T/L Film Clear |
| Apply Protocol Position Restrictions | Detail any Non-Protocol Position Restrictions | |
| No <input type="text" value="No"/> | <div style="background-color: yellow; height: 20px;"></div> | |

| | | |
|--|-------------------------------|---|
| Cervical Spine Clearance | Cervical Spine Cleared | Imaging Report |
| Not Cleared <input type="text" value="Not Cleared"/> | 03/12/2009 1603 | <input type="text" value=""/> |
| Thoracic Spine Clearance | Thoracic Spine Cleared | Imaging Review Notes |
| Clinically and Radiologically Cleared <input type="text" value="Clinically and Radiologically Cleared"/> | 03/12/2009 1604 | <div style="border: 1px solid gray; height: 50px;"></div> |
| Lumbar Spine Clearance | Lumbar Spine Cleared | |
| Clinically and Radiologically Cleared <input type="text" value="Clinically and Radiologically Cleared"/> | 03/12/2009 1604 | |

| | | |
|-------------------------------|-------------------------------|-------------------------------|
| Registrar | Authorising Consultant | Reporting Radiologist |
| <input type="text" value=""/> | <input type="text" value=""/> | <input type="text" value=""/> |

In Progress

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