1. **Objective:**

All trauma patients with a collar to immobilise the C-spine will undergo a systematic physical assessment and, if required, a radiological examination to rule out an injury to the cervical spine. The physical assessment and radiological examination will occur as rapidly as possible to enable removal of the rigid hard collar. Delay to spinal clearance can expose the trauma patient to the complications of immobilisation and can result in an increase in morbidity.

*“Spinal clearance should occur within 48 hours post admission, in order to reduce the incidence of complications of immobilisation.”*\(^1\)

2. **Principles of Action:**

The clearance of the cervical spine will be managed according to the following principles:

- Patient consent
- Patient safety and comfort
- Maintenance of in-line cervical alignment
- Spinal Immobilisation
- Appropriate Medical Imaging
- Timely clinical clearance of cervical spine
- Accurate documentation
3. Definitions:

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full spinal precautions</td>
<td>Application of a cervical collar with or without bilateral head sandbags. The patient must be nursed in the supine position maintaining straight spinal alignment. The patient may only be moved via log rolling with 3 staff members in attendance.</td>
</tr>
<tr>
<td>Nexus C-Spine rules</td>
<td>National Emergency X-Radiography Utilization Group (NEXUS) criteria constitute a decision tool for use in the initial assessment of conscious patients, which allow clinicians to &quot;clear&quot; low-risk patients of c-spine injury, obviating the need for radiography. (Ackland 2006)</td>
</tr>
<tr>
<td>C-Spine Clearance</td>
<td>A systematic physical and radiological examination to determine existence of cervical spine injury</td>
</tr>
<tr>
<td>Hard extrication collar</td>
<td>Rigid one-piece, reusable cervical collar</td>
</tr>
<tr>
<td>Philadelphia collar</td>
<td>Rigid two-piece, single use cervical collar</td>
</tr>
<tr>
<td>Miami J Collar</td>
<td>Rigid two-piece, single use cervical collar</td>
</tr>
<tr>
<td>Aspen Collar</td>
<td>Rigid two-piece, single use cervical collar</td>
</tr>
<tr>
<td>Neck Pack</td>
<td>Analgesia (Panadeine Forte, Ibuprofen), Patient Advice Sheet</td>
</tr>
</tbody>
</table>

4. Roles and Responsibilities:

**Scope:**
- This procedure applies to all clinical staff involved in the assessment and management of all patients at risk of cervical spine injury including the immobilisation of the C – spine whilst patient awaiting clearance.

**Responsibilities:**
- All healthcare professionals involved in the delivery of care to patients with an immobilised C-spine including: Enrolled Nurses (EN’s), Registered Nurses (RN’s), Medical Officers (MO’s), Allied Health Staff and Medical Imaging staff will be responsible.

**Emergency Department/Trauma and Surgical /Intensive Care Registrars/ Consultants**
- Above medical officers to ensure:
  - Clearance of C-spine is undertaken as soon as practicable after the respiratory, haemodynamic and surgical stabilization of the patient (and, if appropriate without Medical Imaging (MI))
  - Physical assessment and imaging will be prompt; if immobilisation has commenced and if MI is required, it is a priority request
  - Patients are not to be left on spinal boards due to the high risk of developing pressure areas, the board should be removed immediately
  - If time to C-spine clearance is anticipated to be greater than one hour, a Philadelphia Collar will be used to maintain C-spine immobilisation, and a
documented management plan clearly stating patient positioning limitations is
initiated.
• If a CT C-Spine scan is obtained clinical staff must discuss the scan with the
senior radiology registrar if a formal written report is unavailable.
• If the C-spine is unable to be cleared post physical assessment and CT scan,
then a neurosurgical consult should be obtained.
• If the patient is referred for return to the Hospital in the Clinic in the Outpatient
Department, with a Philadelphia Collar in situ, the patient must be given a
Neck Pack.
• The Neck Pack will consist of analgesia with instruction sheet, and referral
information and collar care instruction sheet.

Neurosurgical Registrars & Consultants
• Provide specialist review of C-Spine as requested by Emergency/ Trauma/
Surgery or ICU.
• Review must occur promptly and be clearly documented in the patient’s
medical record and/or on Spinal Care Checklist form P230.1
• If the C-spine unable to be cleared by CT Scan and physical assessment, and
further imaging is required to clear i.e. Flexion Extension views, the patient
can remain under the admitting Trauma or subspeciality team.
• If however, an MRI is requested, then the patient must be admitted to the
Neurosurgical Service. An exception to this rule would be patients with
traumatic injuries in ≥ 2 body regions.
• If the patient is referred for return to the Hospital in the Clinic in the Outpatient
Department, with a Philadelphia Collar in situ, the Neurosurgical service must
ensure the patient is given a Neck Pack.
• Neurosurgical Registrars will be called when the patient arrives in the Hospital
in the Clinic; they are to ensure they attend the clinic to see the patient within
30 minutes.

Nursing Staff in all areas
• Collar care (PAC) must be attended fourth hourly and documented in the
patient’s medical record
• Collar Care requires two clinical staff, one to hold head to ensure spine
remains immobilised, whilst the other attends to pressure care.
• Immobilised patients to have pressure care attended fourth hourly.

Hospital in the Clinic (HICL) Staff
• Accept bookings for identified times in the C-Spine injury review clinic
• Call the Neurosurgical Registrar on call via switch upon patient’s arrival for
review in the HICL.
• Expect that Neurosurgical registrars will respond within 30 minutes of
notification of patient’s arrival.
• Will assist with the process if patient is to be referred to the rehabilitation
Head & Neck Injury Clinic post Neurosurgical Registrar review.
• Ensure that patient’s medical record is available for the Neurosurgical
Registrar to review and update in the C-Spine injury review clinic.

5. Process:

Equipment:
• Spinal check list form P230.1
• Spinal Observation chart P 575, if required
• Patient medical record.
Preparation:

- Ensure patient is given an explanation regarding the process of spinal immobilisation.
- Maintain the neutral spinal position, supine on back with tip of the nose and is in line with the sternum and symphysis pubis
- All movement of the patient must ensure careful log rolling of the patient.
- Log rolling will need a minimum of three people, one to hold head and direct movement, two others on same side to ensure safe and co-ordinated turning of patient.
- Care must be taken to avoid flexion or extension or rotation of the spine.
- Remove spinal board if used in transport of patient to hospital.
- Consider use of Jordan Frame if lifting required.

Procedure Steps:

- Radiological clearance of the cervical spine should occur only after the respiratory, haemodynamic and surgical stabilisation of the patient. During such stabilisation the cervical spine should be kept immobilised in an approved cervical spine collar.
  
  o Please refer to Clearance of suspected cervical spine injury in Trauma patient's Part 1 (appendix 1)
  
  o Patients with suspected cervical spine injury should have their C-spine immobilized in a Philadelphia collar.
  
  o Patients who arrive in an extraction collar who cannot have their c-spine immediately cleared without medical imaging are to be placed in a Philadelphia collar.
  
  o In patients who are uncooperative in behaviour, and are refusing and/or removing the immobilisation collar, clinical judgement should be used, to aid gaining the patient’s co-operation.

  Often leaving the collar off is preferable in this situation to ensure the patient maintains spinal alignment until imaging and clinical exam can occur. Documentation of this management plan MUST accompany this decision. When the patient is able to co-operate the collar should be reapplied until formally cleared.

  o CT Scan imaging must be reviewed by a radiology consultant or senior radiology registrar, and one of the following consultants *:
    - ED (Emergency Department) consultant,
    - Trauma surgical consultant,
    - Neurosurgical consultant
    - Intensive Care consultant
  
  o *Note the registrar from any of the above units can document on the Spinal Care Checklist after consultation with a senior medical staff member as listed above, they must identify the consultant.

  o If no abnormalities are detected on CT Scan refer, to Clearance of suspected cervical spine injury in Trauma patient's Part 2 (appendix 2)

  o High risk or indeterminate cases need to be reviewed by the neurosurgical registrar/consultant prior to clearing of the c-spine.
Abnormalities identified on CT imaging require the collar to be left on and a neurosurgical consult obtained, refer to Clearance of suspected cervical spine injury in Trauma patient's Part 3 (appendix 3)

If there is further clinical suspicion (e.g. neurological deficit or patient complains of neck pain) the collar should remain and early neurosurgical consult should

- Optimal timing of the neurosurgical review is within 2 hours of presentation to the Emergency Department.

Cervical Spine clearance for:

- unconscious patients;
- or patients who have significant head injury;
- pelvic or multiple extremity fractures;
- or high risk mechanism which includes:
  - Impact > 50 kph;
  - Vehicle rollover;
  - Fall from height > 3 meters;
  - Death of another occupant in Motor Vehicle Crash (MVC);

- Requires an axial CT C-Spine from the occiput to T2 with sagittal and coronal reconstructions with added soft tissue views.
- The above radiological imaging must be reviewed by a radiology consultant or senior radiology registrar, and one of the following *:
  - ED (Emergency Department) consultant,
  - Trauma surgical consultant,
  - Neurosurgical consultant
  - Intensive Care consultant

*Note the registrar from any of the above units can document on the Spinal Care Checklist after consultation with a senior medical staff member as listed above, they must identify the consultant.

If no abnormalities in the above imaging are found then this should be recorded in the patient’s medical records and/or Spinal Checklist form P230.1 The collar should remain in-situ until clinical exam can be performed.

If the patient has multiple injuries then they will remain under the care of the Trauma Service with regular neurosurgical input, whilst C-spine remains immobilized.

Any abnormalities reported on CT require the collar to be left on and neurosurgical consult obtained. Refer to Appendix 3

If an MRI scan is required to clear the C-spine, then the patient is to be reviewed by the Neurosurgical Service to ensure review of the MRI and formulation of a management plan and/or removal of the collar.

If MRI is negative for injury to C-spine, collar removal is at the discretion of the Neurosurgical service.

If there is suspicion of ligamentous injury, and post discussion with the Neurosurgical team and if patient condition otherwise allows for discharge, they may be referred to Hospital in the Clinic (HICl) situated in outpatients for neurosurgical review. Refer to Appendix 3

If the patient has further imaging upon returning for review in the HICl in the Outpatient Department they will be reviewed and treatment determined by the Neurosurgical Team.
Neurological deficits due to spinal injury: See Appendix 3

- Neurosurgical consult should be obtained as early as possible
- Axial CT C-Spine from the occiput to T2 with sagittal and coronal reconstructions should be obtained.
  - Optimal timing: within 2 hours of presentation to the Emergency Department
  - For patients with neurological deficits referable to cervical spine injury, and particularly those with normal scans, it is extremely important to obtain an MRI scan as soon as possible
  - High dose methylprednisolone therapy will be commenced only upon request of the neurosurgical consultant.
  - Early decompression of mass lesions, such as traumatic herniated discs or epidural haematoma, is also likely to improve neurological outcomes.
  - Consider early referral and transfer to a specialised spinal unit. Decision to transfer an acute spinal injury is at the discretion of the admitting neurosurgical consultant.
  - To refer a patient within the SESI Trauma Network phone POWH Spinal Cord Injury Unit: 02 9382 2222 which will direct call to Spinal Surgeon on call who will establish facts and acceptance of care.
  - If the patient has multiple injuries and a suspected spinal cord injury and/or the POWH Spinal Cord Injury Unit unable to accept care, then RNSH Spinal Cord Injury Unit can be contacted on 02 99267111
  - The AMRS is to be contacted to facilitate the medical retrieval, if appropriate, of adults with an acute spinal cord injury on 1800 650 004.

**Immobilisation Collars:**

- If fitting a Philadelphia Collar please see the *Measurement and Application of Philadelphia Collar*.
- Philadelphia Collars to immobilise the C-spine in unconscious patients should be removed within 48 hours, MRI imaging may be required if physical assessment is unable to occur.
- If a Miami J Collar is required for the C-spine immobilisation, the request must be made by the Neurosurgical service.
- The fitting and supply of Miami J collars is arranged by contacting the ward Physiotherapist in the first instance during normal business hours. After Hours referral will be via Web DeLacy.

**Disposal of Waste/Equipment:**

- All collars are disposable and should be placed in the general waste when no longer required.

**Post Procedure Patient Management:**

- All patients who remain immobilised whilst awaiting medical imaging or team review should be lying supine on a trauma trolley with full spinal precautions unless documented otherwise.
- Nursing staff are to ensure the patient receives adequate analgesia as prescribed by medical staff.
- Nursing staff are to perform hourly neurosensory observations for a minimum of four hours after application of a C-spine immobilisation collar.
- Neurosensory observations are to be recorded on the Spinal Observations Chart P575. Then as clinically indicated.
• Any deterioration in the neurosensory observations should be reported to the admitting team immediately.
• Pressure Area Care of the immobilized patient will occur 4/24 hrly
• Maintain the neutral spinal position, supine on back with tip of the nose and is in line with the sternum and symphysis pubis
• All movement of the patient must ensure careful log rolling of the patient.
• Log rolling will need a minimum of three people, one to hold head and direct movement, two others on same side to ensure safe and co-ordinated turning of patient.
• Care must be taken to avoid flexion or extension or rotation of the spine.
• Pressure points are to be kept dry, and the skin stimulated with either a mild soap and water or a bland lotion to lubricate the skin.
• To reduce incidence of pressure area formation from cervical collars, patients are to receive 4/24 collar care whilst observing full spinal precautions. This involves checking pressure points e.g. around the ears, under the chin, at the back of the head and around the shoulders as per the Procedure for Management and Application of Philadelphia Collar.
• Patients who are immobilized with spinal precautions in place, and who are to be admitted to a ward, are to be transferred off the trauma trolley and placed on a normal ward bed prior to transfer to the ward.
• Prior to transfer to the ward ED staff are to call the ward the patient is being transferred to, and have the bed sent to the Emergency Department to ensure the transfer is completed safely with appropriate equipment i.e. a Jordan Frame

Documentation:
• All patients requiring C-spine immobilisation must have this documented in the medical record. Included in this, is the time the collar was applied, the type of collar applied, and the size of the collar applied.
• Regular neurosensory observations should be attended and documented.
• If the C-spine is unable to be cleared without medical imaging, and patient is admitted to hospital and has mobilization restrictions in place, the patient should have a spinal care checklist form P230.1 commenced.
• All Pressure Area care should be documented.

6. Compliance:
• Compliance will be monitored by exception reporting, through the Incident Management System, RiskMan and in accordance with the SVH Feedback and Incident Management Policy
• Audit of Neurosurgical Checklist will be undertaken by ICU Nurse Educator at 6 & 12 month intervals.
• Neurosensory Observation Chart audit will be undertaken by the Neurosurgical Care Coordinator at 6 & 12 month intervals.
• Feedback report obtained from Hospital in the Clinic (HICl) in 3 month interval to evaluate Neurosurgical response times.

7. References:
• Supporting Evidence:
  • Practice management guidelines for identification of cervical spine injuries following trauma. 2009 Eastern Association for the Surgery (EAST)
  • Acute Spinal Cord Injury of the Adult – Management & Referral Procedure. SESLHD – Medicine, Critical Care and Emergency Stream. 2013
  • Rural Adult Emergency Clinical Guidelines, 3rd ed, version 3.1 2012. Statewide Services Branch, Ministry of Health NSW.
Procedure for the Clearance for Cervical Spine Collar Removal in Trauma Patients

Date approved: January 2014

WARNING – Printed copies of this document may be out of date. The most current version is available electronically via the Clinical Workstation intranet webpage.


- Critical Care Tertiary Referral Networks & Transfer of Care (Adults) NSW Ministry of Health PD 2010_021

- National Safety & Quality Health Service Standards:
  - Standard 1: Governance for Safety and Quality in Health Service Organisations

- Related SVH and SVHA Policies & Procedures:
  - SVHA Clinical Quality & Safety Policy
  - SVH Measurement and Application of Philadelphia Collar Procedure
  - SVH Miami J Collar Policy