# SESLHD GUIDELINE COVER SHEET

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| **FORMER REFERENCE(S)** | SESLHDGL/056 – Cervical Collars for Suspected Cervical Spine Injury in the Emergency Department<br>SGH-TSH CLIN 048 Cervical (Philadelphia / philly) collar – care of a patient requiring a<br>SGH CLIN 361 Clearance of a Suspected Cervical spine injury in the Emergency Department *(Also used by TSH ED)*<br>POW Clinical Business Rule Cervical; Spine Immobilisation: Initial Stabilisation Post Suspected Injury in the Adult Patient |
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| **FUNCTIONAL GROUP(S)** | Critical Care and Emergency Medicine |
| **KEY TERMS** | Cervical Spine, Clearance, Cervical Collars, Emergency Department, Trauma |
| **SUMMARY** | This document outlines the appropriate use and application of soft and Philadelphia cervical collars and |

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| | nursing care in the Emergency Department (ED) for suspected spine injury. It also contains a guide to the clearance of suspected cervical spine injury in the ED. |

# SESLHD GUIDELINE COVER SHEET

Health
South Eastern Sydney
Local Health District

## Cervical Spine Management in the Emergency Department (ED)

# Section 1 - Background

### Acute cervical spine trauma

Is a broad range of potential injuries to ligaments, muscles, bones, and spinal cord that follow acute incidents ranging from a seemingly innocuous fall to a high-energy motor vehicle accident. Patients may present immediately or several days after a traumatic incident. In all cases, careful investigation is required to ensure that the stability of the cervical spine has not been compromised, because, in extreme cases, cervical spine instability can lead to progressive neurological deficit, quadriplegia, and even death.

If there is evidence of any of the following in a patient following an incident felt to be compatible with a possible cervical spine injury, the clinician should apply spinal immobilisation.

- Altered mental status (Glasgow Coma Scale <15, amnesic pre or post event)
- Neurological deficit (e.g., subjective limb weakness, numbness, tingling, dysaesthesia or parathesia)
- Evidence of drug or alcohol intoxication
- High suspicion of Traumatic Brain Injury (TBI)
- Presence of cervical spine pain or tenderness
- High risk mechanism such as;
    - Death in the same vehicle
    - Intrusion into occupant compartment >30cm
    - Steering wheel deformity
    - Fall - more than 3 meters
    - Fall from horse
    - Patient side impact to vehicle
    - Vehicle vs. vehicle (>60km, combined speed)
    - Vehicle vs. pedestrian/cyclist/motorbike (>30km)
    - Ejected from vehicle
    - Entrapment with compression
    - Focal blunt trauma to head or torso
    - High voltage injury
    - Crush injures (excluding toes/fingers)
    - Any rapid deceleration mechanism
    - Ligature/ strangulation/ hanging

### Immobilisation

There are several methods employed to immobilise the cervical spine ranging from manual head and neck control, through to cervical collar application.

Manual inline cervical spine immobilisation is frequently used when awaiting the application of a cervical spinal collar, maintaining neutral head and neck alignment whilst changing a cervical collar or when opening a cervical collar to inspect and attend to patient skin care.

### Manual inline cervical spine immobilisation

- Cervical spine immobilisation is to occur simultaneously whilst assessing and/or when securing the patient's airway where required.
- Stand at the head of the bed.
- Place both arms either side of the patient's head down to the top of the shoulder and grip the head and neck with your hands and forearms to prevent movement.
- Hold the top of the shoulders for additional support.
- Second assistant can then begin to inspect and ensure that the patient's skin is clean and dry and any wounds are covered. Jewellery such as necklaces and earrings must be removed.
- Continue in-line stabilisation until a cervical collar can be fitted, or until it is no longer deemed necessary.
- Administer adequate analgesia where possible.
- Document your assessment, findings and care provided in the patient's electronic medical record (eMR).

### Cervical Collar

A cervical collar is an orthotic device that may be used to physically and consciously acknowledge the potential for c-spine injury. Although available devices may limit movement within the c-spine, no device has been shown to immobilise it completely. There is a lack of evidence for the efficacy of spinal immobilisation in the prevention of spinal cord injury (SCI).

This document will refer to the management of patients with the application of a soft foam collar or a Philadelphia collar.

The following two sections will cover the principles and management of soft collars and Philadelphia collars. Clinical scenarios are available in Section 4.

# Section 2 - Principles and Management of Soft Collars

**Aim**

To act as a marker for staff to apply spinal care principles whilst minimising equipment related adverse events.

The cervical soft collar is a disposable single use device made from soft, open-cell foam plastic with a cotton stockinette cover and touch tape closure.

**Inclusion criteria**

- Suspicion for a traumatic cervical spine injury with a Glasgow coma scale (GCS) of 15
- Suspicion for a traumatic cervical spine injury with an altered level of consciousness and no acute injury identified on CT C-Spine (e.g. fracture, dislocation, ligamentous disruption, paravertebral soft tissue swelling suggestive of ligamentous disruption, intervertebral disc bulging with impingement on spinal cord presumed to be acute, spinal cord trauma, epidural haematoma).

**Exclusion criteria**

- Surgical Airway
- Penetrating neck trauma
- Clinical indication of spinal cord injury (limb weakness/deficit/priapism/neurogenic shock). Apply a Philadelphia collar(Application of a Philadelphia collar)
- Radiological evidence of cervical spine bone injury (Apply a Philadelphia collar)

1. **Applying a soft foam Collar means continue spinal care precautions (log roll with inline stabilisation +/- sandbags)**

2. **C-spine immobilisation should not subtract from visual inspection of neck structures (high suspicion for tracheal deviation, subcutaneous emphysema)**

## Positioning

To optimise the neutral position a folded towel (height approximately 1-2 cm) can be placed underneath the adult / adolescent patient's head (Fig.1) or the upper torso of the child patient (size and age dependent) (Fig 2).

- Explain procedure to patient and gain verbal consent, assess and document neurological status
- Maintaining spinal precautions, log roll patient into lateral position to allow sufficient space to position the folded towel
- Maintaining spinal precautions, log roll return the patient to supine position
- Ensure patient comfort and complete appropriate documentation
- **Head of bed elevation at 20-30 degrees:** If not contraindicated by patient haemodynamics / injuries example pelvic or thoracolumbar spine fracture.

Fig 1. - Achieving a neutral neck position in an infant

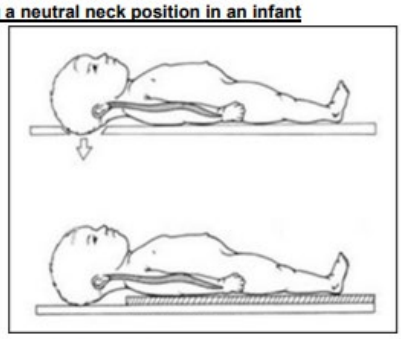


Fig 2. Achieving neutral neck position in a child

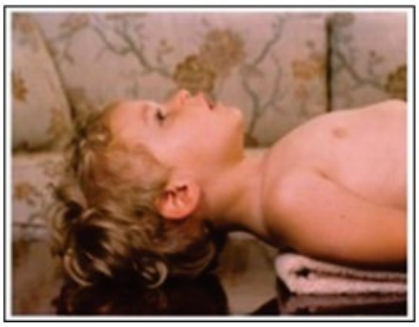


Fig 3. Achieving neutral neck position in an older child/adolescent

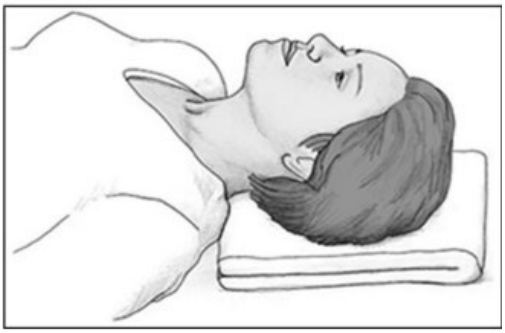


Fig 4. Achieving neutral neck position in an adult

*Images adapted from SCH Network with permission*

***For older patients particularly those with significant cervicothoracic kyphosis consideration should be given to support the head with two pillows/other support example towels to ensure neutral alignment***

Application of a soft collar
Refer to Appendix A: Soft Collar Application

# Section 3 – Principles and management of a Philadelphia / Philly Collar

## Aim

To provide neck immobilisation. Correct sizing of the collar is important for effective cervical spine immobilisation and patient comfort.

A rigid foam device that is used on patients with highly suspected or confirmed cervical spine injuries. It can be used to provide head and neck stabilisation; this will greatly assist in reducing pressure trauma complications associated with long term, hard collar use.

## Inclusion criteria

- Sensory and/or motor deficits following injury
- Clinical indications of spinal cord injury (limb weakness / deficit / priapism / neurogenic shock)
- Radiological evidence of cervical spine bone injury

## Exclusion criteria

- Surgical airway
- Penetrating neck trauma

1. **Applying a soft Philadelphia Collar means continue spinal care precautions (log roll with inline stabilisation +/- sandbags)**

2. **C-spine immobilisation should not subtract from visual inspection of neck structures (high suspicion for tracheal deviation, subcutaneous emphysema)**

## Positioning

To optimise the neutral position a folded towel (height approximately 1-2 cm) can be placed underneath the adult patient's head (Fig.1) or the upper torso of the child patient (size and age dependent) (Fig 2).

- Explain procedure to patient and gain verbal consent, assess and document neurological status
- Maintaining spinal precautions / inline c spine immobilisation, log roll patient into lateral position to allow sufficient space to position the folded towel
- Maintaining inline c spine immobilisation, log roll return the patient to supine position
- Ensure patient comfort and complete appropriate documentation
- **Head of bed elevation at 20-30 degrees:** If not contraindicated by patient haemodynamics / injuries example pelvic or thoracolumbar spine fracture.

Fig 1. - Achieving a neutral neck position in an infant

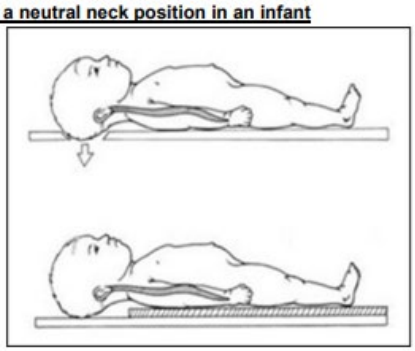


Fig 2. Achieving neutral neck position in a child

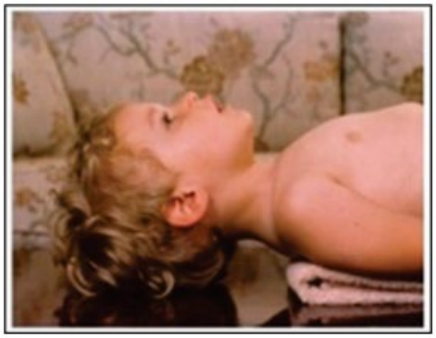


Fig 3. Achieving neutral neck position in an older child/adolescent

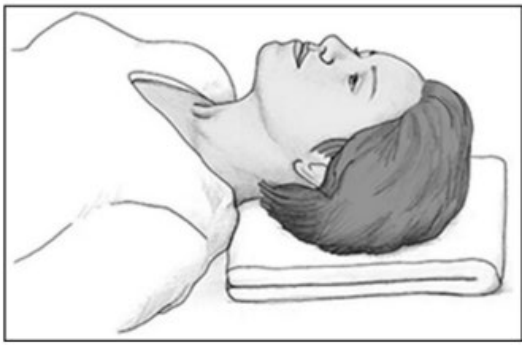
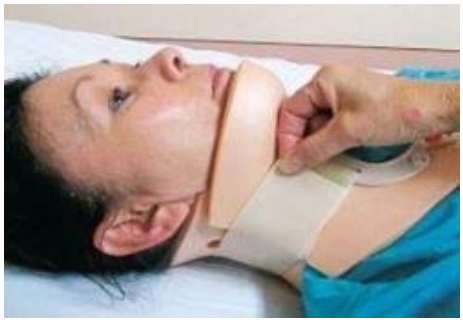


Fig 4. Achieving neutral neck position in an adult



*Images adapted from SCH Network with permission*

***For older patients particularly those with significant cervicothoracic kyphosis consideration should be given to support the head with two pillows/other support example towels to ensure neutral alignment.***

## Application of a Philadelphia collar

Step by step process refer to Appendix B: Philadelphia Collar Application Step guide to the application process

**Fitting assistance / concerns for**

- **POWH:** Between 0800-1630 hours Monday-Friday, Orthotics may be contacted (Extension 28184) to undertake a patient fitting or review of a cervical collar. In the case of an emergency an on-call Orthotist is available for weekend and public holidays between 0800-1630 hours. The on-call orthotist can be contacted via hospital switchboard. Any request to fit a new collar should include a referral, this is usually an eMR Orthotics Consult order request, providing patient information, location, request details, and contact details.

- **SGH:** For ill-fitting collars at SGH, contact the Trauma Physiotherapy pager #412, Trauma Case Manager pager #012, Neurosurgical Registrar pager #938 or Orthotist for assistance with customised cervical orthosis (i.e Miami J / Aspen collars) (Ph 9522 2990 leave a message after hours / if phone not answered).

- **TSH:** For Ill-fitting collars at TSH, contact the TSH Emergency Department CNE /CNC (Ph 9540 7115 or pager #106) or Orthotist for assistance with customised cervical orthosis (i.e Miami J / Aspen collars) (Ph 9522 2990 leave a message after hours / if phone not answered).

- **SSEH:** Ambulance NSW (ANSW) will bypass SSEH ED with suspected spinal injuries. If a patient self-presents with suspected spinal injuries they would be managed expeditiously in the Resus Room on a trauma bed with spinal precautions including a soft foam collar & sandbags until urgent imaging (high Resolution CT cervical spine) is performed to determine if there is bony injury or malalignment of the cervical spine. If there are no NEXUS criteria and CT is negative the patient will continue to be managed in a soft foam collar until senior clinical decision is made to clear the patient of c-spine injury and continue further management. If there is any concern for neurologic deficit or CT abnormality, the local spinal unit (POWH) will be contacted via the neurosurgical registrar on call to transfer care expeditiously with all available spinal precautions. If the patient meets trauma criteria in addition to spinal pathology, the local trauma service (SGH) will be contacted via the SGH Trauma Hotline (phone 9113-4500) to transfer care expeditiously with all available spinal precautions. At this stage SSEH does not stock Philadelphia collars as it does not have the specialised workforce (orthotists, physiotherapists, trauma CNC or CNS) to support their application and maintenance of spinal precautions for any protracted length of time. As per the current guidelines on spinal injury care in the initial phases SSEH will use soft foam collars & sandbags as well as trauma beds for the intial care of such cases.

# Section 4 – Scenarios

- Patients who arrive via Ambulance without a soft collar, and who cannot have their cervical spine cleared immediately on clinical criteria should have a soft (foam) collar applied if they fulfil criteria for this device, or a Philadelphia collar if they do not.

- For patients with a neurologic deficit or radiological evidence of a cervical spine injury, a Philadelphia collar should be applied until Spinal Surgery review and/or advice from SGH trauma hotline.

- Patients who have an altered mental state and have no acute injury identified on cervical spine CT may remain in an Ambulance NSW soft foam collar, they should be prioritised for imaging and if injuries are identified on CT they must be changed to an appropriate device (Phillidelphia, Miami J, Aspen collar) with consultation from Spinal Surgery / Trauma Team. If no injuries are identified on cervical spine CT the patient must remain in a soft foam collar with cervical spine precautions in place until awake and cervical spine can be cleared.

# Section 5 - Pressure Area Care

Pressure Area Care is delivered according to NSW Health Policy Directive PD2021_023 - Pressure Injury Prevention and Management.

- Always ensure region to be covered by either a soft collar or Philadelphia Collar is free of debris and fluid, wounds are covered appropriately, jewellery removed prior to applying collar as this will contribute to skin breakdown.
- Once a soft collar / Philadelphia Collar is applied, it must be removed and skin inspection attended every four hours to assess for pressure injuries and skin moisture.
- A patient must be turned every 2-4 hours and pressure area care (PAC) attended as per their waterlow score / PAC nursing care plan.
- Log roll with inline C Spine immobilisation must be attended throughout.
- A patient with a soft collar fitted should have mobility orders documented in the clinical notes by the treating team.

# Section 6 – Clearance of Cervical Spine in the Emergency Department (ED)

Clearing the cervical spine is the process by which a medical officer determines whether cervical spine injuries exist. This process takes place in the ED by senior experienced medical officers. The cervical spine assessment and removal of the collar MUST be completed by the senior medical officer and documented in eMR.

Cervical spine clearance can occur using a clinical assessment tool without additional radiographic imaging.

**Two established criteria guiding cervical spine clearance are:**

1. The National Emergency X-Radiology Utilisation Study Group (NEXUS) rules / criteria
2. Canadian C-Spine rule (CCR)

**NEXUS criteria**

The five NEXUS criteria that must all be met to classify a patient as low probability for a cervical spine injury and allow an attempt at clinical clearance without cervical spine radiological investigation are:

- Normal alertness (GCS 15)
- No intoxication with medications, alcohol, illicit drugs
- No painful distracting injury
- No posterior midline cervical tenderness
- No focal neurological deficit or symptoms (paraesthesia)

Even if the patient fulfils all of the NEXUS criteria that would allow assessment of the cervical spine without radiology, it does not mean that the cervical spine can automatically be clinically cleared.

Once NEXUS criteria has been assessed:

- Assess function/ability to move
- Ask the patient to rotate their neck voluntarily left to right to 45 degrees and then lift their head up off the bed (flex the neck) voluntarily.

Those who can do this with ease can be cleared despite the fact they may have some degree of pain (i.e. a neck strain/sprain/whiplash).
Those that are limited in range of motion, or clearly in significant discomfort with these movements should proceed to cervical spine imaging.

Patients with high risk mechanisms may still warrant cervical spine radiology to further assess areas of interest.

**Canadian C-Spine rule (CCR)**

1. Inclusion criteria

- Age 16-65
- Stable vital signs
- Alert

2. Exclusion criteria:
   - Neurologic deficit or paraesthesia
   - Dangerous / high risk mechanism
   - Known vertebral disease or precious C-spine surgery

3. Any low risk-factor to allow assessment of cervical range of motion:
   - Simple rear-end motor vehicle collision OR
   - Sitting in the emergency department OR
   - Ambulatory at the time of injury OR
   - Delayed onset of neck pain OR
   - Absence of midline C-spine tenderness

4. Able to actively rotate neck 45 degrees left and right.

Any patient that does not meet criteria to assess the cervical range of motion or fails the range of motion test (inability to achieve rotation of the cervical spine due to pain) warrants further imaging and continued cervical spine immobilisation.

## CERVICAL SPINE IMAGING

### CT Scan

When ordering a CT scan, the reason and clinical assessment findings (e.g. site of spine tenderness) should be clearly documented in the radiology request

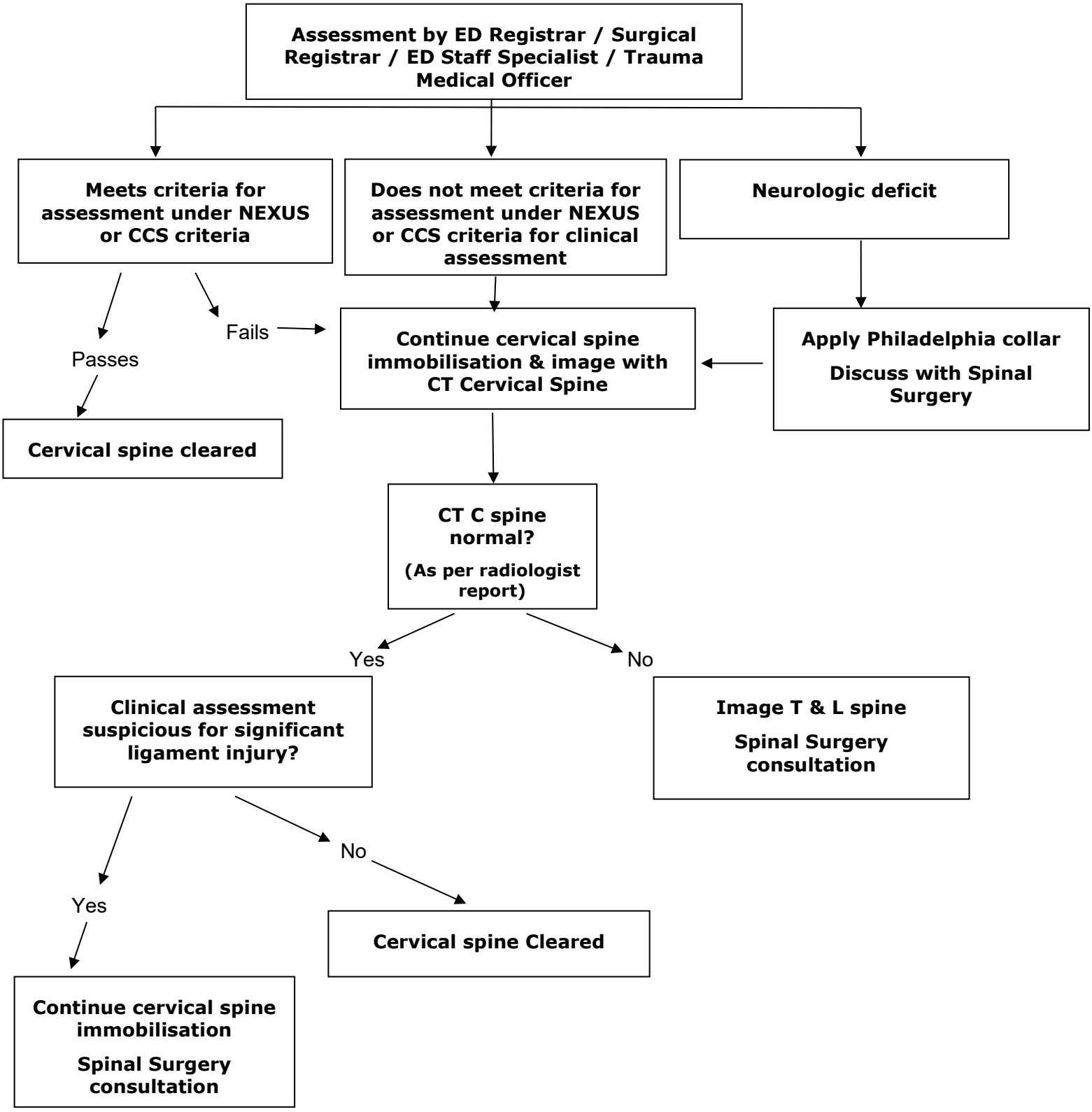
CT scanning of areas of injury, abnormality, areas of clinical and/or radiological suspicion should be performed after discussion and consultation with Senior ED or Radiology Staff. This should be coordinated with the scanning of other areas of interest in the trauma patient

CT scans of the cervical spine must be interpreted and results documented by either the Radiology Registrar/Consultant or Neurosurgical Registrar/Consultant prior to cervical spine clearance. While awaiting formal reporting, and if no obvious abnormality seen on the CT scan by the treating emergency physician, the patient can be placed in a soft (foam) collar, maintaining routine spinal precautions, per Clinical Business Rule SGH CLIN352

Patients with significant pain with neck movement or reluctance to move their necks are suspicious for cervical ligament injury. Consultation with Spinal Surgery should occur and a soft (foam) collar applied. MRI may be ordered at the discretion of the neurosurgical service.

If clinical or radiological concerns continue, despite consultation by Registrars from ED, Spinal Surgery, Trauma or Radiology, then the issue should be escalated to the Consultant responsible for that Registrar, for final resolution

## Clinical Flowchart for the Clearance of a Suspected Cervical Spine Injury in the ED



## Section 7 - Staff Education & Training

Soft cervical collar measuring, application and the principles of the device is covered in ED nursing orientation across all sites within SESLHD.

In addition, a mastery for measuring and applying a c spine collar is available on page 57 of the Transition to Practice Emergency Nursing Program participant's workbook.

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SGH/TSH BR 767 Cervical Collar and Spinal Brace- Management and Care of A patient Requiring A: CERVICAL COLLAR AND SPINAL BRACE – MANAGEMENT AND CARE OF A PATIENT REQUIRING A

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# Section 9 - Version and Approval History

| Date | Version no: | Author and approval notes |
|---|---|---|
| April 2022 | DRAFT | Initial draft. Draft for comment period. |
| July 2022 | DRAFT | Sarah O'Hare SESLHD CNC – Trauma & P.A.R.T.Y.<br>Endorsed by Executive Sponsor, SESLHD Clinical Stream Director, Critical Care. |
| September 2022 | 1 | Approved at Clinical and Quality Council for publishing. |
| October 2022 | 2 | Minor edit of wording in Section 6. Approved by Executive Sponsor. |
| 12 December 2024 | 2.1 | Minor review of document with Network Trauma Committee<br>• Minor edit of Clinical Flowchart for the Clearance of a Suspected Cervical Spine Injury in the ED.<br>• Staff Education & Training Section 7 created<br>• Appendix A - Soft Collar Application - pictures changed<br>• Appendix B - Philadelphia Collar Application – pictures changed<br>• Appendix B - Philadelphia Collar Application step 2 now includes information on fixed kyphotic deformity (e.g. some elderly patients with cervicothoracic kyphosis)<br>• Appendix C - POW Philadelphia Collar Form removed (now eMR request)<br>• Rigid collar section deleted due to NSW ambulance no longer using rigid collar devices. |

# Appendix A: Soft Collar Application

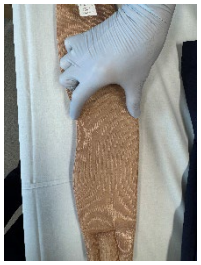
- Explain procedure to patient, assess and document neurological status
- Maintain c-spine precautions using two staff members ( One - maintaing C-spine precautions, two - applying the collar)
- Remove stiff neck collar (pre-hospital) if required
- Ensure region to be covered by collar is free of debris and fluid, wounds are covered appropriately, jewellery removed
- Follow application of soft collar instruction below:

**Step 1**

- Gently align the patients head in neutral anatomical position
- Measure the distance between the base of the chin and the suprasternal notch.

**Step 2**

- Select the appropriate size collar by comparing the patient's neck measurement to the width of soft collar's chin support

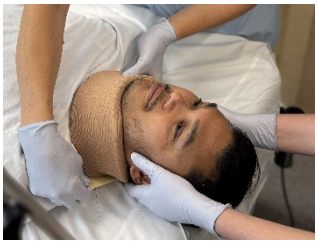


**Step 3**

- Slide the soft collar under the patient's neck (right to left) until the Velcro tab is visible.

**Step 4**

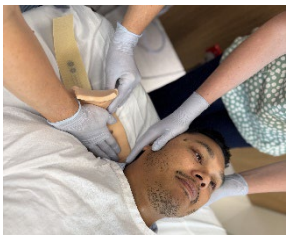
- Ensure the patient's chin rests comfortably on top of the soft collar
- Ensure patient can open their mouth
- Mould the soft collar around the patient's neck
- Fasten the Velcro tab



# Appendix B: Philadelphia Collar Application

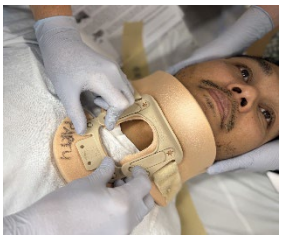
**Step guide to the application process**

**Step 1**



- Always ensure region to be covered by Philadelphia Collar is free of debris and fluid, wounds are covered appropriately, jewellery removed prior to applying collar as this will contribute to skin breakdown.
- Check the patient's neurological status prior to procedure.
- Place the back of collar on patient while one staff member continues to maintain inline stabilisation of head and neck. To achieve best positioning without compromising inline stabilisation, it may require the staff member to push down into the bed as they are sliding the back of the collar under the patient. Ensure the collar is positioned under ear lobes, arrow is pointing up and the collar piece is central.

**Step 2**



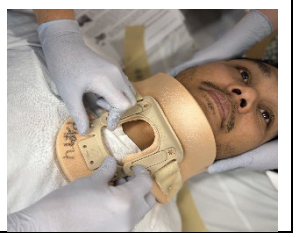
- Prior to measurement, ensure neutral c-spine alignment so that measurements and fitting is correct. A folded towel (height approximately 1-2 cm) can be placed underneath the adult patient's head to assist in maintaining normal cervical spine alignment and will also help with comfort.

  *In the case of patients with a fixed kyphotic deformity (e.g. some elderly patients with cervicothoracic kyphosis) thicker towels or pillow/s may be required to support the head to prevent excessive cervical extension.*
- Place the front piece of collar to front of neck ensuring the patients chin rests in the chin-cup. Slide the lower section down or up to align the bottom of opening with sternal notch and to ensure neck isn't hyper/hypo extended. Observe the number that is in line with correct fit and then fit off the patient

**Step 3**

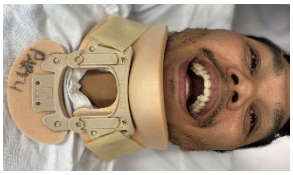
- Lift the front away from patient, remove sticky tabs and push the two tabs to lock into the correct size which was measured for the patient.
- **Once locked into position the collar cannot be re sized.**

**Step 4**



- Adjust circumference by tearing away sections of the back piece foam (if any portion of back section is visible through front window, tear 1 tab section from both sides until not visible).
- Centre the collar by the head holding person confirming alignment

**Step 5**



- Apply the front of the collar with the chin secured in the chin-cup
- Fasten Velcro tabs
- Ensure the patient can open their mouth and feels comfortable.
- Document the procedure, size/type of collar used and skin status including any dressing applied. Recheck neurological status, note any alterations, document findings and escalate as appropriate.