

Trauma Center Practice Management Guideline

Blank Children's Hospital — Des Moines

Pediatric Cervical Spine Evaluation and Clearance

PEDIATRIC Practice Management Guideline	Effective: 04/2014
Contact: Trauma Center Medical Director	Last Reviewed: 05/2017

PURPOSE

To provide guidelines for the diagnostic evaluation and subsequent clearance of cervical spine injuries in the traumatically injured pediatric patient.

DEFINITIONS

Radiologic clearance of the cervical spine should occur only after the hemodynamic, respiratory, and surgical stabilization of the patient is complete. During such stabilization the cervical spine should be kept in spinal movement restriction with an approved well fitted cervical spine collar.

GUIDELINES

Pediatric trauma patients at risk for cervical spine injury are categorized, according to their clinical presentation, into either a high risk or low risk category. Guidelines are subsequently presented by patient category.

1. **Low risk:** Those patients who present after a traumatic event with all of the following criteria met: **No neck pain, no evidence of intoxication, normal level of consciousness, normal neurological exam and the absence of painful distracting injury.**
 - A. Cervical spine x-rays are not necessary (see section 3.0), but may be ordered at provider discretion. (If radiographs are completed they should be done according to the following algorithm.)
 - B. Plain Films
 - Ages 0-5 years
 - Anteriorposterior view revealing the spinous processes of the second cervical through the first thoracic vertebra.
 - Lateral view revealing the base of the occiput to the upper border of the first thoracic vertebrae
 - Ages over 5 years
 - Anteroposterior view revealing the spinous processes of the second cervical through the first thoracic vertebra.

- Lateral view revealing the base of the occiput to the upper border of the first thoracic vertebrae
 - Open mouth odontoid view revealing the lateral masses of the first cervical vertebra and entire odontoid process.
- C. CT Scan of the cervical spine may be used as an alternate to plain films at the discretion of the ordering physician, or if a CT is required to evaluate for additional injuries.
- D. If evidence of Cervical Spine Injury on Plain Film or CT scan a consultation with Neurosurgery is required and the patient should be kept in spinal movement restriction.
- E. If no radiographic evidence of injury exists but there is continued concern, stability of the cervical spine can be confirmed via dynamic flexion and extension films in an awake, cooperative patient.
- If negative, cervical spine is cleared.
 - If evidence of instability, c-collar is to be replaced, spine immobilized, and neurosurgery consulted.
 - If unable to perform flexion/extension or unsatisfactory results, leave patient in properly fitted cervical collar, consider role of NSAIDs and arrange follow up with neurosurgery in 7-14 days.

2. High Risk: Those patients who present after a traumatic event with any one (or more) of the following NEXUS criteria: **cervical spine tenderness, evidence of intoxication, altered level of consciousness, abnormal neurologic exam or painful distracting injury.**

- A. Plain films:
- Ages 0-5 years
 - Anteroposterior view revealing the spinous processes of the second cervical through the first thoracic vertebra.
 - Lateral view revealing the base of the occiput to the upper border of the first thoracic vertebrae.
 - Ages over 5 years
 - Anteroposterior view revealing the spinous processes of the second cervical through the first thoracic vertebra.
 - Lateral view revealing the base of the occiput to the upper border of the first thoracic vertebrae.
 - Open mouth odontoid view revealing the lateral masses of the first cervical vertebra and entire odontoid process.
- B. CT Scan: CT Scan of the cervical spine may be used as an alternate to plain films at the discretion of the ordering physician, or if a CT is required to evaluate for additional injuries.
- C. If evidence of Cervical Spine Injury on Plain Film or CT scan a consultation with Neurosurgery is required and the patient should be kept in spinal movement restriction.
- D. If Plain Films are negative but patient has any of the following, take action as recommended below:
- C spine tenderness
 - Flexion/Extension Films (For patients with a normal neurological exam)
 - Consider MRI if non-cooperative or unable to perform active ROM
 - Intoxication
 - Clear cervical spine when clinically unimpaired.
 - Altered Level of Consciousness
 - MRI when clinically appropriate
 - Altered Neurological Exam

- MRI as soon as possible and consult neurosurgery
- Painful distracting injury
 - Stabilize and control pain of injuries and attempt to clear clinically
- E. If any injury to the c-spine is identified, proceed with evaluation of the entire spine.
- F. Spine x-ray clearance
 - When a patient is admitted, the patient's spine and neurological status will be clearly documented in the progress notes section of the medical record.
 - Cervical spine clearance should be documented in the progress notes section of the medical record in addition to the doctor's order section for removal of cervical collar.

*Note: For those patients admitted to the trauma service, a mid-level provider with Trauma Services or Neurosurgery services may clear the patient's cervical spine once case is discussed with the attending trauma surgeon. C-spine clearance is subsequently documented in the progress notes.

FORMS/ALGORITHMS

See the following attached algorithms:

- *Pediatric Cervical Spine Injury Protocol: Low Risk*
- *Pediatric Cervical Spine Injury Protocol: High Risk*

REFERENCES

Rozzelle CJ, Aarabi B, Dhall SS, Gelb DE, Hurlbert RJ, Ryken TC, Theodore N, Walters BC, Hadley MN. Management of pediatric cervical spine and spinal cord injuries. *Neurosurgery*. 2013 Mar; 72 Suppl 2:205-26.

Eastern Association for the Surgery of Trauma (2000). *Determination of Cervical Spine Stability in Trauma Patients*.

Hoffman JR, Mower WR, Wolfson AB, Todd KH, et al. *Validity of a set of clinical criteria to rule out injury to the cervical spine in patients with blunt trauma. National Emergency X-Radiology Utilization Study Group* *N Engl J Med* 343(2): 94-99,2000

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Pediatric Cervical Spine Injury Protocol

Low Risk Mechanism of Injury

PEDIATRIC Practice Management Guideline	Effective: 04/2014
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C-Collar in Place
Small children need shoulder padding for neutral positioning

Mechanism of injury considered, low risk for cervical spine injury, and absence of neck pain and, no evidence of intoxication and, normal LOC and, normal neurological exam and, absence of painful distracting injury

Cervical spine imaging may be ordered at provider discretion

Normal C-Spine Exam
C-Spine cleared and documented

Abnormal C-Spine Exam
Pain with ROM

Plain Films
A/P/lateral – up to 5 years of age
A/P/lateral/odontoid – over 5 years of age
CT if unable to get good quality plain films

Evidence of CSI
Consult Neurosurgery & Maintain C-Spine Precautions

Negative Films
Confirm stability with dynamic films (flexion/extension)

Unable to Perform Flex/Ex or Unsatisfactory Results
CT cervical spine

Negative Flex/Ex
C-spine cleared & documented

Evidence of Instability
Consult Neurosurgery & Maintain C-Spine Precautions

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Pediatric Spine Injury Protocol High Risk Mechanism of Injury

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