

CERVICAL SPINE EVALUATION

Original Release/Approval:	1 Mar 2010	Note: This CPG requires an annual review
Reviewed:	Feb 2010	Approved: 1 Mar 2010
Supersedes:	This is a new CPG and must be reviewed in its entirety	
<input type="checkbox"/> Minor Changes (or)	<input type="checkbox"/> Changes are substantial and require a thorough reading of this CPG (or)	
<input type="checkbox"/> Significant Changes		

1. Goal. To provide a brief review of the indications for and methods of determining if a combat casualty patient has sustained a cervical spine injury.

2. Background.

- a. While cervical spine (CS) injuries are relatively common in major trauma, they have received less attention in the combat environment due to the prevalence of penetrating injury mechanisms. With the high incidence of explosive injury in present conflicts, providers must pay greater attention to the indications for and methods of ruling out cervical spine injury, or what is popularly referred to as cervical spine clearance.
- b. Physical exam is essential for cervical spine clearance, but most patients will require some form of imaging. Imaging studies traditionally included plain radiographs in the anterior-posterior, lateral, and odontoid views. Swimmers views or flexion-extension views have been added as adjuncts in some protocols.
- c. In the past decade Computed Tomography (CT) Scanning has supplanted plain radiography as the primary screening modality for patients who require imaging. In the combat environment, plain radiography should be utilized only in situations where a CT scanner is unavailable.

3. Evaluation and Treatment.

- a. **Indications for cervical collar placement in the pre-hospital environment.** All patients who have sustained injuries through the following mechanisms should have a cervical collar placed in the pre-hospital environment if the tactical situation allows:
 - Trauma resulting in loss of consciousness or even the question of loss of consciousness due to any form of head injury
 - Trauma resulting in temporary amnesia
 - Major explosive or blast injury
 - Mechanism that produces a violent impact on the head, neck, torso or pelvis
 - Mechanism that creates sudden acceleration/ deceleration or lateral bending forces on the neck or torso
 - Fall from height (vs. fall from standing)
 - Ejection or fall from any motorized vehicle
 - Vehicle roll-over

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- (1) Any patient complaining of neck pain or displaying neurological impairment following a trauma should have a cervical collar placed.
 - (2) Patients with penetrating cervical injury from an explosive mechanism should have a cervical collar placed if possible. When a blunt mechanism is combined with a penetrating injury, the cervical collar is an important protection until unstable spinal injury is ruled out, but all providers must be aware that the collar may hide other injuries and developing pathology such as expanding hematoma. Patients with isolated penetrating cervical injury who are conscious and have no neurologic signs should not have a cervical collar placed in the pre-hospital environment. Patients with isolated penetrating brain injury do not require a cervical collar unless the trajectory suggests cervical spine involvement.
 - (3) **On the battlefield, preservation of the life of the casualty and medic are of paramount importance. In these circumstances, evacuation to a more secure area takes precedence over spine immobilization.**
 - (4) If a patient has indications for cervical collar placement, and one had not been placed in the pre-hospital environment for whatever reason, the collar should be placed at the earliest opportunity.
- b. **Indications for Cervical Spine Clearance Algorithm.** Any patient with a suspected cervical spine injury and a neurologic deficit should have a cervical collar in place, and should be referred immediately for neurosurgical consultation and imaging. All other patients who have indications for pre-hospital cervical collar placement as detailed above should undergo cervical spine clearance by algorithm. There are separate algorithms for reliable and unreliable patients. Unreliable patients are those who cannot adequately communicate, have a decreased level of consciousness (GCS<15), or have a significant distracting injury.
- (1) Significant distracting injury is defined as any injury which is so painful that it may obscure the patient's ability to notice pain in their neck. Some evidence suggests proximity increases the risk of distraction, and therefore upper extremity and upper torso injuries are more likely to be distracting than lower torso or lower extremity injuries. The treating physician has final say in determining a certain injury is distracting enough to render a patient unreliable and require clearance via the unreliable patient algorithm. If uncertain, err on the side of caution and consider the injury distracting and proceed accordingly.
- c. **Cervical spine clearance algorithms.** See Appendix A for protocol diagrams. If possible, the cervical spine should be cleared and the collar removed within 24 hours of collar placement. If the clinical scenario requires the collar remain in place over 24 hours, stiff extrication collars should be replaced with collars designed for long-term immobilization that provide greater padding and decubitus ulcer prevention.
- d. **Cervical spine clearance in the obtunded patient.** CS clearance in the obtunded patient presents additional challenges to the clinician, especially in the combat environment. These patients should undergo CT CS clearance; flexion/extension radiography should not be done in the comatose patient. For the obtunded patient with a negative CT and gross motor function of extremities, the risk/benefit ratio of obtaining an MRI in addition

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to CT is not clear at present. The incidence of significant CS injury with a negative CT CS is small and approaches zero. There are significant, nontrivial risks in bringing severely injured, mechanically ventilated patients to the MRI suite and the first level of care offering MRI capability for CENTCOM trauma patients is Level IV. Additionally, many believe a CS MRI should be performed within 72 hours of injury to be able to adequately detect soft-tissue injury. Although most patients reach Level IV within 72 hours of injury, some do not. Since there is currently no compelling evidence that MRI is a clinically significant adjunct to a negative CT SC CS in the obtunded patient, MRI is not recommended as an adjunct to CT CS clearance in the obtunded patient at this time and the cervical collar may be removed in these patients if the CT CS is negative.

- e. **Cervical spine clearance documentation.** It is preferred that the JTTS Cervical Spine Clearance Note (Appendix C) be used for documenting the cervical spine evaluation and clearance status. This comprehensive note includes indications for clearance, exam, imaging studies, and final clearance status. The note is intended to bring together all cervical spine information onto one sheet of paper and was designed to improve both the completeness and speed of documentation.

4. Author. The primary author for this CPG is Nelson G. Rosen, LTC,MC, USA, Chief, 1st Forward Surgical Team.

5. Responsibilities. It is the responsibility of the trauma team leader to ensure compliance with this CPG.

6. References.

¹ Arishita GI, Vaver JS, Bellamy RF. “*Cervical spine immobilization of penetrating neck wounds in a hostile environment*,” J Trauma. 1989 Mar;29(3):332-7.

² Eastern Association for the Surgery of Trauma, *Practice management guidelines for identification of cervical spine injuries following trauma – update*, available at <http://www.east.org/tpg.asp>, accessed 20090425.

³ Emergency War Surgery Handbook, Third United States Revision. Borden Institute, Walter Reed Army Medical Center, Washington, DC, 2004.

⁴ Heffernan DS, Schermer CR, Lu SW. “*What defines a distracting Injury in Cervical Spine Assessment?*” J Trauma 2005 Dec;59(6):1396-9.

⁵ Mahoney PF, Steinbruner D, Mazur R, et al. “*Cervical Spine Protection in a Combat Zone*”, Electronic Publication. Injury 2007. Oct; 38(10):1222-20.

⁶ Salomone JP, Pons PT, McSwain NE, eds. *PHTLS Prehospital Life Support: Military Version*, Mosby Elsevier, St. Louis, Sixth Edition, 2007.

⁷ Como, JJ, et.al. “*Practice Management Guidelines for Identification of Cervical Spine Injuries Following Trauma: Update From the Eastern Association for the Surgery of Trauma Practice Management Guidelines Committee*,” J Trauma. 2009; 67: 651-659.

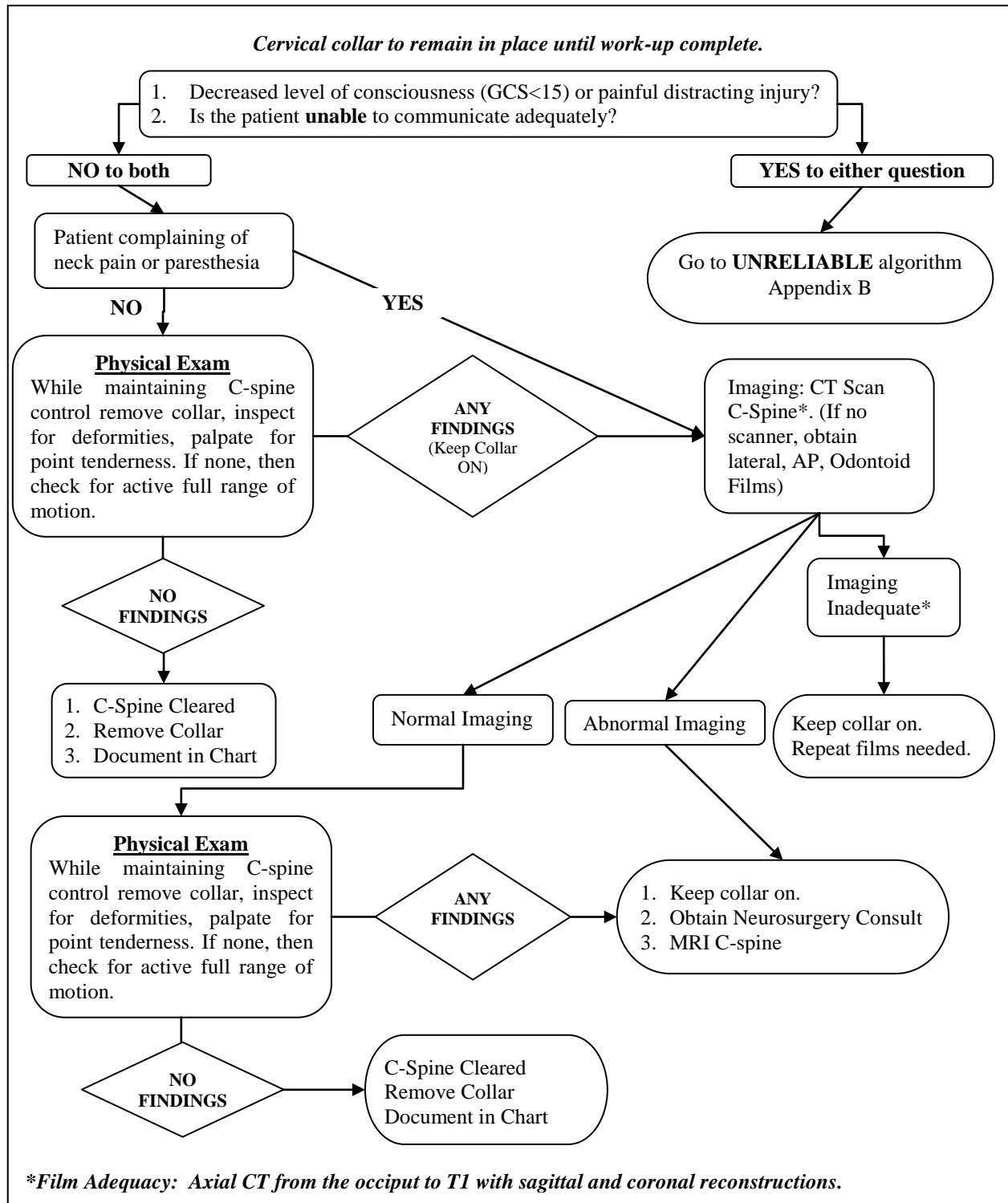
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Approved by CENTCOM JTTS Director, JTS Director
and Deputy Director and CENTCOM SG

APPENDIX A

CERVICAL SPINE CLEARANCE ALGORITHM RELIABLE PATIENT WITH NO NEUROLOGIC DEFICIT

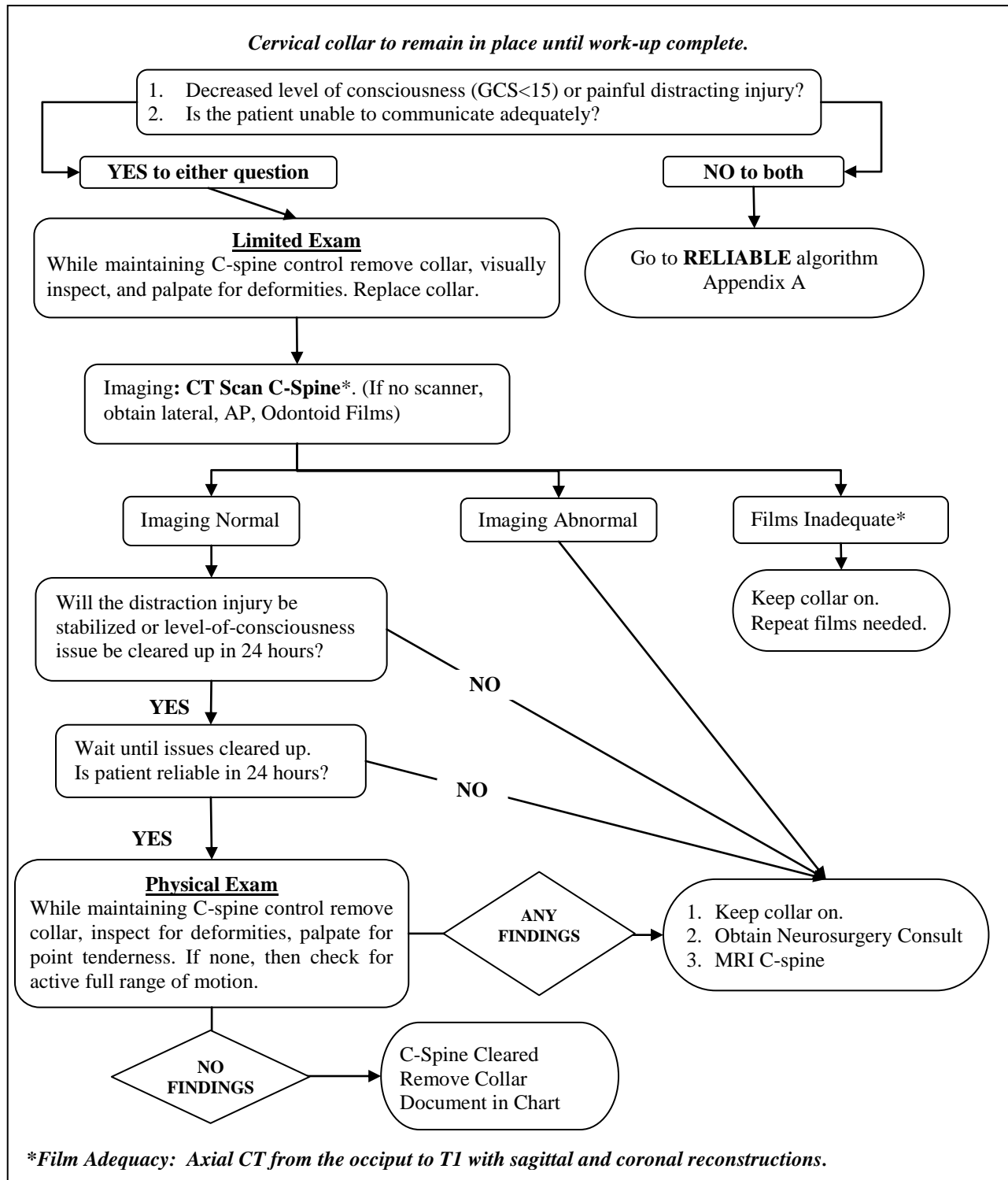


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APPENDIX B

CERVICAL SPINE CLEARANCE ALGORITHM - UNRELIABLE PATIENT



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APPENDIX C

JOINT THEATER TRAUMA SYSTEM – CERVICAL SPINE CLEARANCE STATUS

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Mechanism: ☐ Explosive ☐ MVC ☐ Fall ☐ Other

Notes: _____

Collar placed: ☐ Pre-hospital ☐ Hospital ☐ No Collar

**Patient
RELIABLE?**

☐ Yes ☐ No

Reason Unreliable:

☐ Altered Mental Status (GCS<15)

☐ Significant Distracting Injury

Notes: _____

**Patient
Complaints**

☐ None

☐ Neck Pain (where: _____)

☐ Paresthesia

Notes: _____

Physical Findings

Inspection:

☐ Normal

☐ Abnormal: _____

Palpation:

☐ Normal

☐ Point Tenderness

☐ Deformity

Notes: _____

**Active Range
of Motion:**

☐ Full

☐ Limited: _____

Notes: _____

Imaging Studies [CT is Standard. Films acceptable only when CT is unavailable]

CT SCAN:

☐ Normal

☐ Abnormal: _____

Notes: _____

Lateral

☐ Normal

☐ Abnormal: _____

AP

☐ Normal

☐ Abnormal: _____

Odontoid

☐ Normal

☐ Abnormal: _____

C L E A R A N C E

**The
Cervical
Spine is:**

☐ **CLEAR** of significant injury and instability on the basis of the following:

☐ Normal exam in completely reliable patient with no need for imaging.

☐ Normal imaging of full C-Spine and normal exam.

☐ **NOT CLEAR** on the basis of the following:

☐ Neurological complaint or abnormal physical exam finding

☐ Abnormal imaging

☐ Unreliable patient at time of evaluation

Physician _____ / _____ MTF: _____ Date/Time: _____

Print Name

Signature

PATIENT'S IDENTIFICATION: (For typed or written entries give: Name – last, first, middle; ID No or SSN;
Sex; Date of Birth; Rank/Grade)

JTTS Cervical Spine Clearance Note

Medical Record (Rev. May 2009)

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