

# Diagnostic Imaging Pathways - Thoraco-Lumbar Spine Trauma

## Population Covered By The Guidance

This pathway provides guidance on imaging patients at risk of thoraco-lumbar spine injury following trauma.

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### Quick User Guide

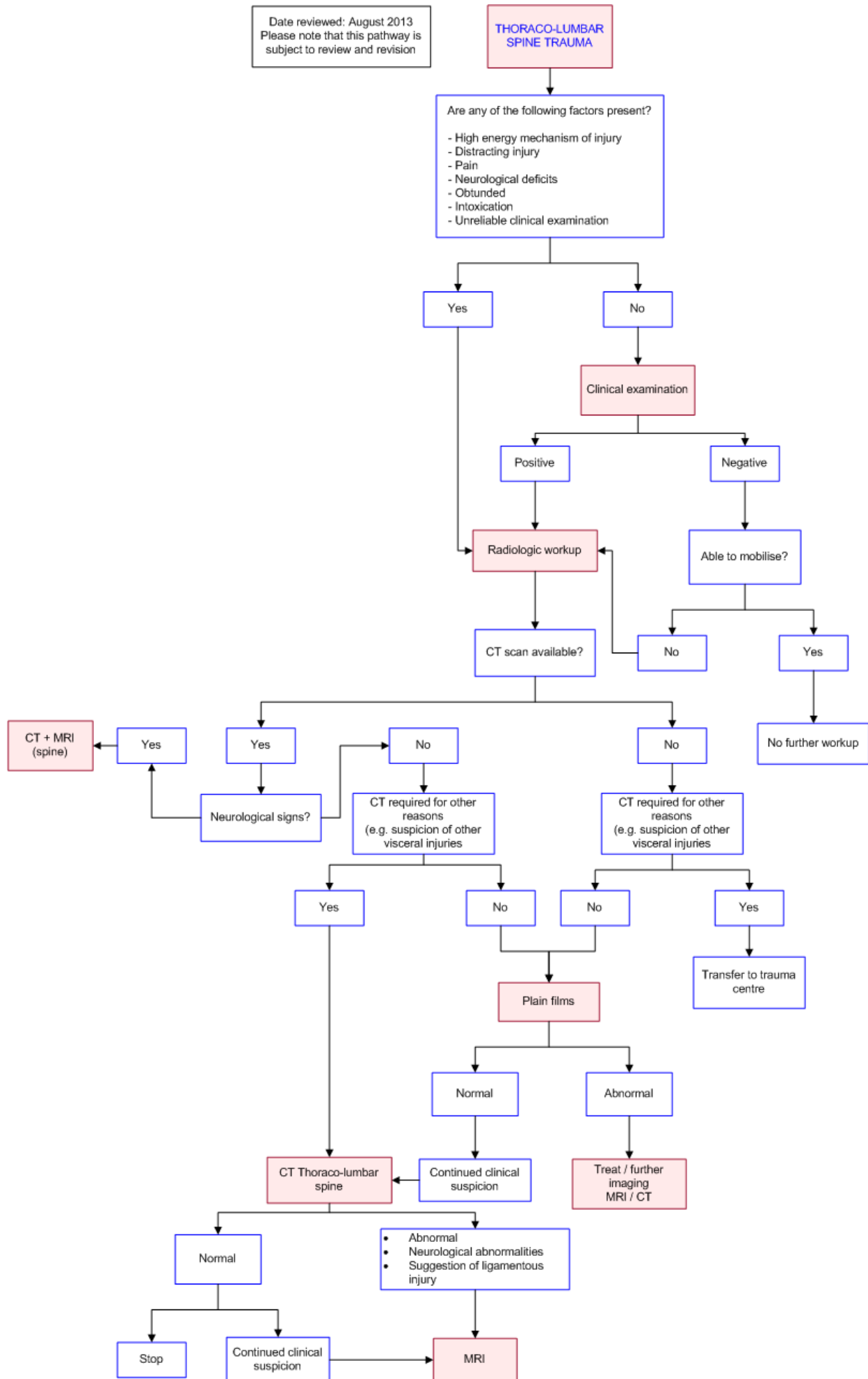
Move the mouse cursor over the **PINK** text boxes inside the flow chart to bring up a pop up box with salient points.

Clicking on the **PINK** text box will bring up the full text.

The relative radiation level (RRL) of each imaging investigation is displayed in the pop up box.

SYMBOL	RRL	EFFECTIVE DOSE RANGE
	None	0
	Minimal	< 1 millisieverts
	Low	1-5 mSv
	Medium	5-10 mSv
	High	>10 mSv

## Pathway Diagram



## Image Gallery

*Note: Images coming soon.*

## Teaching Points

- Radiologic workup is indicated for high energy mechanism of injuries including
  - Altered mental status, evidence of intoxication with ethanol or drugs, distracting injuries, neurologic deficits, and spine pain or palpation tenderness
  - In general falls from significant height (> 10 feet), motor vehicle / motorcycle / all-terrain vehicle crash with or without ejection, pedestrians struck, assault, sport / crush accident, bicycle, and a concomitant cervical spine fracture are considered to have high energy mechanism of injury
- Plain films are considered adequate for the evaluation of thoracolumbar spine if the patient does not require CT scan for any other reason
- If CT is required, reformatted scan of the chest/abdomen is more accurate in screening for thoracolumbar fractures compared to plain films
- MRI is indicated for patients with neurologic deficits as well as when clinical suspicion is high despite a normal plain film and/or normal CT scan

## Computed Tomography (CT)

- Multi-detector CT-scan with reformatted axial collimation is superior to plain films in the screening of the thoracolumbar spine(TLS) for bony injury. [1,6](#) CT-scan scout films can be used for spine assessment [1,7,8](#)
- CT is better than plain radiograph especially when multiple injuries are being evaluated. If trauma patients with multiple injuries are undergoing HCT scanning as part of an evaluation for visceral injury, there is minimal added cost for spine fracture screening if chest and abdominal protocol scans are reformatted to examine the spine [9](#)
- CT screening is far faster and shortens time to removal of spine precautions [10,11](#)
- Screening the TLS on truncal helical CT scanning performed for the evaluation

**of visceral injuries is more accurate than TLS imaging by standard radiography [10](#)**

- **Reformatted CT scan of the chest/abdomen was found to be accurate in screening for thoracolumbar fractures in a study by Sheridan et al. [9](#) Sensitivity for thoracic fractures was 97% (compared with 62% for plain radiography)**
- **Brandt et al also recommended the utilization of the initial visceral CT to evaluate the spine in trauma patients [12](#)**
- **Another study by Wintermark et al revealed that multi-detector row CT can replace conventional radiography and be performed alone in patients who have sustained severe trauma dramatically increasing sensitivity while saving time, radiation exposure, and cost [6](#)**
- **With multislice CT the entire chest, abdomen and pelvis can be imaged with one contrast bolus in one acquisition sequence. This data can then be reformatted and can be used to examine the bony structures of the TLS with no additional scan time, radiation, or patient movement [13](#)**
- **At this time, there is no Class I data available. However in the metanalysis by Inaba et al, all evaluable studies demonstrated superior sensitivity and interobserver variability for reformatted CT when compared with plain radiographic screening. CT was also more accurate in localising, classifying, and delineating the age, bony intrusion, and soft-tissue damage associated with the fracture [13](#)**
- **The obtunded patient, due to intoxication or closed head injury, presenting at a center without CT scan capability, should be transferred to nearest available trauma center [1](#)**

## Clinical Examination

- **The Eastern Association for the Surgery of Trauma (EAST) Practice Management Guideline Committee gives Level II recommendations about all trauma patients to be clinically examined by a qualified attending physician [1](#)**
- **Those qualified include: Trauma surgeons, emergency physicians, or spine surgeons (Orthopedic or Neurosurgery) [1](#)**

## Thoraco-Lumbar Spine (TLS) Injury

- **Although there are numerous clinical studies addressing screening of the thoracolumbar spine, to date there are no randomised studies and only a few prospective studies specifically addressing the subject [1](#)**

## Magnetic Resonance Imaging

- MRI is indicated for patients with neurologic deficits [14](#), abnormal CT scans, or clinical suspicion despite normal radiographic evaluation suggesting an unstable injury [1](#)
- For patients with neurologic deficits referable to a thoracolumbar spine injury, and those with normal plain films, it is extremely important to obtain an MRI scan as soon as possible after admission to the Emergency Department [1](#)

## Radiological Work-up For a Thoraco-lumbar Spine Injury

- As per the metanalysis by the EAST Practice Management Guideline Committee all of the publications fail to clearly define the criteria used to decide who gets radiographs or CT-scans [1](#)
- Trauma patients that are awake, without any evidence of intoxication with ethanol or drugs, with normal mental status, neurological, and physical examinations can be cleared clinically without any radiologic work-up [1,2](#)
- Radiologic workup is indicated for high energy mechanism of injuries including
  - Altered mental status, evidence of intoxication with ethanol or drugs, distracting injuries, neurologic deficits, and spine pain or palpation tenderness [1](#)
  - In general falls from significant height (> 10 feet), motor vehicle / motorcycle / all-terrain vehicle crash with or without ejection, pedestrians struck, assault, sport / crush accident, bicycle, and a concomitant cervical spine fracture are considered to have high energy mechanism of injury [1,3,4](#)

## Plain Radiography

- Plain films are considered adequate for the evaluation of thoracolumbar spine if the patient does not require CT scan for some other reason [1,4,5](#)

## References

References are graded from Level I to V according to the Oxford Centre for Evidence-Based Medicine, Levels of Evidence. [Download the document](#)

- [1.](#) Diaz JJ Jr, Cullinane DC, Altman DT, Bokhari F, Cheng JS, Como J, et al. Practice management guidelines for the screening of thoracolumbar spine

- fracture. J Trauma. 2007;63(3):709-18. (Level II evidence)**
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- 3. Lund PJ et al. Traumatic thoracolumbar facet instability:characteristic imaging findings. Skeletal Radiol. 1997;26(6):360-5. (Review article)**
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- 9. Sheridan R, Peralta R, Rhea J, et al. Reformatted visceral protocol helical computed tomographic scanning allows conventional radiographs of the thoracic and lumbar spine to be eliminated in the evaluation of blunt trauma patients. J Trauma. 2003;55:665-9. (Level II evidence)**
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- 12. Renowden S. Cerebral venous sinus thrombosis. Eur Radiol. 2004;14(2):215-26. (Review article)**
- 13. Inaba K, Munera F, McKenney M, Schulman C, de Moya M, Rivas L, et al. Visceral torso computed tomography for clearance of the thoracolumbar spine in trauma: a review of the literature. J Trauma. 2006;60:915-20. (Level II evidence).**
- 14. Reinus WR, Strome G, Zwemer FL Jr. Use of lumbosacral spine radiographs in a level II emergency department. AJR Am J Roentgenol. 1998;170(2):443-7. (Level III evidence)**



## Information for Consumers

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