

# Spinal injury: assessment and initial management

NICE guideline

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## Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in [your care](#).

[Making decisions using NICE guidelines](#) explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

Recommendations apply to both children (under 16s) and adults (16 or over) unless otherwise specified.

### 1.1 *Assessment and management in pre-hospital settings*

#### Assessment for spinal injury

1.1.1 On arrival at the scene of the incident, use a prioritising sequence to assess people with suspected trauma, for example <C>ABCDE:

- catastrophic haemorrhage
- airway with in-line spinal immobilisation (for guidance on airway management refer to the NICE guideline on [major trauma](#))
- breathing
- circulation
- disability (neurological)
- exposure and environment.

1.1.2 At all stages of the assessment:

- protect the person's cervical spine with manual in-line spinal immobilisation, particularly during any airway intervention and
- avoid moving the remainder of the spine.

1.1.3 Assess the person for spinal injury, initially taking into account the factors listed below. Check if the person:

- has any significant distracting injuries
- is under the influence of drugs or alcohol
- is confused or uncooperative
- has a reduced level of consciousness
- has any spinal pain
- has any hand or foot weakness (motor assessment)
- has altered or absent sensation in the hands or feet (sensory assessment)
- has priapism (unconscious or exposed male)
- has a history of past spinal problems, including previous spinal surgery or conditions that predispose to instability of the spine.

1.1.4 Carry out full in-line spinal immobilisation if any of the factors in recommendation 1.1.3 are present or if this assessment cannot be done.

## Assessment for cervical spine injury

1.1.5 Assess whether the person is at high, low or no risk for cervical spine injury using the Canadian C-spine rule as follows:

- the person is at high risk if they have at least one of the following high-risk factors:
  - age 65 years or older
  - dangerous mechanism of injury (fall from a height of greater than 1 metre or 5 steps, axial load to the head – for example diving, high-speed motor vehicle collision, rollover motor accident, ejection from a motor vehicle, accident involving motorised recreational vehicles, bicycle collision, horse riding accidents)
  - paraesthesia in the upper or lower limbs
- the person is at low risk if they have at least one of the following low-risk factors:
  - involved in a minor rear-end motor vehicle collision

- comfortable in a sitting position
- ambulatory at any time since the injury
- no midline cervical spine tenderness
- delayed onset of neck pain
- the person remains at low risk if they are:
  - unable to actively rotate their neck 45 degrees to the left and right (the range of the neck can only be assessed safely if the person is at low risk and there are no high-risk factors).
- the person has no risk if they:
  - have one of the above low-risk factors and
  - are able to actively rotate their neck 45 degrees to the left and right.

1.1.6 Be aware that applying the Canadian C-spine rule to children is difficult and the child's developmental stage should be taken into account.

## Assessment for thoracic or lumbosacral spine injury

1.1.7 Assess the person with suspected thoracic or lumbosacral spine injury using these factors:

- age 65 years or older and reported pain in the thoracic or lumbosacral spine
- dangerous mechanism of injury (fall from a height of greater than 3 metres, axial load to the head or base of the spine – for example falls landing on feet or buttocks, high-speed motor vehicle collision, rollover motor accident, lap belt restraint only, ejection from a motor vehicle, accident involving motorised recreational vehicles, bicycle collision, horse riding accidents)
- pre-existing spinal pathology, or known or at risk of osteoporosis – for example steroid use
- suspected spinal fracture in another region of the spine
- abnormal neurological symptoms (paraesthesia or weakness or numbness)

- on examination:
  - abnormal neurological signs (motor or sensory deficit)
  - new deformity or bony midline tenderness (on palpation)
  - bony midline tenderness (on percussion)
  - midline or spinal pain (on coughing)
- on mobilisation (sit, stand, step, assess walking): pain or abnormal neurological symptoms (stop if this occurs).

1.1.8 Be aware that assessing children with suspected thoracic or lumbosacral spine injury is difficult and the child's developmental stage should be taken into account.

## When to carry out or maintain full in-line spinal immobilisation

1.1.9 Carry out or maintain full in-line spinal immobilisation if:

- a high-risk factor for cervical spine injury is identified and indicated by the Canadian C-spine rule
- a low-risk factor for cervical spine injury is identified and indicated by the Canadian C-spine rule and the person is unable to actively rotate their neck 45 degrees left and right
- indicated by one or more of the factors listed in recommendation 1.1.7.

1.1.10 Do not carry out or maintain full in-line spinal immobilisation in people if:

- they have low-risk factors for cervical spine injury as identified and indicated by the Canadian C-spine rule, are pain free and are able to actively rotate their neck 45 degrees left and right
- they do not have any of the factors listed in recommendation 1.1.7.

## How to carry out full in-line spinal immobilisation

1.1.11 When immobilising the spine tailor the approach to the person's specific circumstances (see recommendations 1.1.12 and 1.1.16 to 1.1.18).

- 1.1.12 The use of spinal immobilisation devices may be difficult (for example in people with short or wide necks, or people with a pre-existing deformity) and could be counterproductive (for example increasing pain, worsening neurological signs and symptoms). In uncooperative, agitated or distressed people, including children, think about letting them find a position where they are comfortable with manual in-line spinal immobilisation.
- 1.1.13 When carrying out full in-line spinal immobilisation in adults, manually stabilise the head with the spine in-line using the following stepwise approach:
- Fit an appropriately sized semi-rigid collar unless contraindicated by:
    - a compromised airway
    - known spinal deformities, such as ankylosing spondylitis (in these cases keep the spine in the person's current position).
  - Reassess the airway after applying the collar.
  - Place and secure the person on a scoop stretcher.
  - Secure the person with head blocks and tape, ideally in a vacuum mattress.
- 1.1.14 When carrying out full in-line spinal immobilisation in children, manually stabilise the head with the spine in-line using the stepwise approach in recommendation 1.1.13 and consider:
- involving family members and carers if appropriate
  - keeping infants in their car seat if possible
  - using a scoop stretcher with blanket rolls, vacuum mattress, vacuum limb splints or Kendrick extrication device.

## Extrication

- 1.1.15 When there is immediate threat to a person's life and rapid extrication is needed, make all efforts to limit spinal movement without delaying treatment.
- 1.1.16 Consider asking a person to self-extricate if they are not physically trapped and have none of the following:

- significant distracting injuries
- abnormal neurological symptoms (paraesthesia or weakness or numbness)
- spinal pain
- high-risk factors for cervical spine injury as assessed by the Canadian C-spine rule.

1.1.17 Explain to a person who is self-extricating that if they develop any spinal pain, numbness, tingling or weakness, they should stop moving and wait to be moved.

1.1.18 When a person has self-extricated:

- ask them to lay supine on a stretcher positioned adjacent to the vehicle or incident
- in the ambulance, use [recommendations 1.1.1 to 1.1.13](#) to assess them for spinal injury and manage their condition.

1.1.19 Do not transport people with suspected spinal injury on a longboard or any other extrication device. A longboard should only be used as an extrication device.

## 1.2 *Pain management in pre-hospital and hospital settings*

### Pain assessment

1.2.1 See the NICE guideline on [patient experience in adult NHS services](#) for advice on assessing pain in adults.

1.2.2 Assess pain regularly in people with spinal injury using a pain assessment scale suitable for the patient's age, developmental stage and cognitive function.

1.2.3 Continue to assess pain in hospital using the same pain assessment scale that was used in the pre-hospital setting.

### Pain relief

1.2.4 Offer medications to control pain in the acute phase after spinal injury.

1.2.5 For people with spinal injury use intravenous morphine as the first-line analgesic and adjust the dose as needed to achieve adequate pain relief.



1.2.6 If intravenous access has not been established, consider the intranasal<sup>[1]</sup> route for atomised delivery of diamorphine or ketamine.

1.2.7 Consider ketamine in analgesic doses as a second-line agent.

### 1.3 *Immediate destination after injury*

1.3.1 Be aware that the optimal destination for patients with major trauma is usually a major trauma centre. In some locations or circumstances intermediate care in a trauma unit might be needed for urgent treatment, in line with agreed practice within the regional trauma network.

### Suspected spinal cord injury

1.3.2 Transport people with suspected acute traumatic spinal cord injury (with or without column injury), with full in-line spinal immobilisation, to a major trauma centre irrespective of transfer time, unless the person needs an immediate lifesaving intervention.

1.3.3 Ensure that time spent at the scene is limited to giving life-saving interventions.

1.3.4 Divert to the nearest trauma unit if a patient with suspected acute traumatic spinal cord injury (with or without column injury), with full in-line spinal immobilisation, needs an immediate life-saving intervention, such as rapid sequence induction of anaesthesia and intubation, that cannot be delivered by the pre-hospital teams.

1.3.5 Do not transport people with suspected acute traumatic spinal cord injury (with or without column injury), with full in-line spinal immobilisation, directly to a spinal cord injury centre from the scene of the incident.

### Suspected spinal column injury

1.3.6 Transport adults with suspected spinal column injury without suspected acute traumatic spinal cord injury, with full in-line spinal immobilisation, to the nearest trauma unit, unless there are pre-hospital triage indications to transport them directly to a major trauma centre.

- 1.3.7 Transport children with suspected spinal column injury (with or without spinal cord injury) to a major trauma centre.

## 1.4 *Emergency department assessment and management*

- 1.4.1 On arrival at the emergency department use a prioritising sequence for assessing people with suspected trauma (see [recommendation 1.1.1](#)).
- 1.4.2 Protect the person's cervical spine as in [recommendation 1.1.2](#) or maintain full in-line spinal immobilisation.
- 1.4.3 Assess the person for spinal injury as in [recommendation 1.1.3](#).
- 1.4.4 Carry out or maintain full in-line spinal immobilisation in the emergency department if any of the factors in [recommendation 1.1.3](#) are present or if this assessment cannot be done.

### **Suspected cervical spine injury**

- 1.4.5 Assess the person with suspected cervical spine injury using the Canadian C-spine rule (see [recommendations 1.1.5 and 1.1.6](#)).

### **Suspected thoracic or lumbosacral spine injury**

- 1.4.6 Assess the person with suspected thoracic or lumbosacral spine injury using the factors listed in [recommendations 1.1.7 and 1.1.8](#).

### **When to carry out or maintain full in-line spinal immobilisation and request imaging**

- 1.4.7 Carry out or maintain full in-line spinal immobilisation and request imaging if:
- a high-risk factor for cervical spine injury is identified and indicated by the Canadian C-spine rule or
  - a low-risk factor for cervical spine injury is identified and indicated by the Canadian C-spine rule and the person is unable to actively rotate their neck 45 degrees left and right or
  - indicated by one or more of the factors listed in [recommendation 1.1.7](#).

1.4.8 Do not carry out or maintain full in-line spinal immobilisation or request imaging for people if:

- they have low-risk factors for cervical spine injury as identified and indicated by the Canadian C-spine rule, are pain free and are able to actively rotate their neck 45 degrees left and right
- they do not have any of the factors listed in [recommendation 1.1.7](#).

## How to carry out full in-line spinal immobilisation

1.4.9 When carrying out or maintaining full in-line immobilisation refer to [recommendations 1.1.11 to 1.1.14](#).

## 1.5 Diagnostic imaging

1.5.1 Imaging for spinal injury should be performed urgently, and the images should be interpreted immediately by a healthcare professional with training and skills in this area.

## Suspected spinal cord or cervical column injury

### Children

1.5.2 Perform MRI for children (under 16s) if there is a strong suspicion of:

- cervical spinal cord injury as indicated by the Canadian C-spine rule and by clinical assessment or
- cervical spinal column injury as indicated by clinical assessment or abnormal neurological signs or symptoms, or both.

1.5.3 Consider plain X-rays in children (under 16s) who do not fulfil the criteria for MRI in recommendation 1.5.2 but clinical suspicion remains after repeated clinical assessment.

1.5.4 Discuss the findings of the plain X-rays with a consultant radiologist and perform further imaging if needed.

- 1.5.5 For imaging in children (under 16s) with head injury and suspected cervical spine injury, follow the recommendations in section 1.5 of the NICE guideline on [head injury](#).

## Adults

- 1.5.6 Perform CT in adults (16 or over) if:
- imaging for cervical spine injury is indicated by the Canadian C-spine rule (see [recommendation 1.4.7](#)) or
  - there is a strong suspicion of thoracic or lumbosacral spine injury associated with abnormal neurological signs or symptoms.
- 1.5.7 If, after CT, there is a neurological abnormality which could be attributable to spinal cord injury, perform MRI.
- 1.5.8 For imaging in adults (16 or over) with head injury and suspected cervical spine injury, follow the recommendations in section 1.5 of the NICE guideline on [head injury](#).

## Suspected thoracic or lumbosacral column injury only (children and adults)

- 1.5.9 Perform an X-ray as the first-line investigation for people with suspected spinal column injury without abnormal neurological signs or symptoms in the thoracic or lumbosacral regions (T1–L3).
- 1.5.10 Perform CT if the X-ray is abnormal or there are clinical signs or symptoms of a spinal column injury.
- 1.5.11 If a new spinal column fracture is confirmed, image the rest of the spinal column.

## Whole-body CT

- 1.5.12 Use whole-body CT (consisting of a vertex-to-toes scanogram followed by CT from vertex to mid-thigh) in adults (16 or over) with blunt major trauma and suspected multiple injuries. Patients should not be repositioned during whole-body CT.

- 1.5.13 Use clinical findings and the scanogram to direct CT of the limbs in adults (16 or over) with limb trauma.
- 1.5.14 If a person with suspected spinal column injury has whole-body CT carry out multiplanar reformatting to show all of the thoracic and lumbosacral regions with sagittal and coronal reformats.
- 1.5.15 Do not routinely use whole-body CT to image children (under 16s). Use clinical judgement to limit CT to the body areas where assessment is needed.

## 1.6 *Communication with tertiary services*

- 1.6.1 For people in a trauma unit who have a spinal cord injury, the trauma team leader should immediately contact the specialist neurosurgical or spinal surgeon on call in the trauma unit or nearest major trauma centre.
- 1.6.2 For people in a major trauma centre who have a spinal cord injury, the trauma team leader should immediately contact the specialist neurosurgical or spinal surgeon on call.
- 1.6.3 For people who have a spinal cord injury, the specialist neurosurgical or spinal surgeon at the major trauma centre or trauma unit should contact the linked spinal cord injury centre consultant within 4 hours of diagnosis to establish a partnership of care.
- 1.6.4 All people who have a spinal cord injury should have a lifetime of personalised care that is guided by a spinal cord injury centre.

## 1.7 *Early management in the emergency department after traumatic spinal cord injury*

- 1.7.1 All trauma networks should have network-wide written guidelines for the immediate management of a person with spinal cord injury and these should be agreed with the linked spinal cord injury centre.
- 1.7.2 The management of a spinal cord injury should be agreed between spinal surgery and spinal cord injury specialists for each person.

1.7.3 Do not use the following medications, aimed at providing neuroprotection and prevention of secondary deterioration, in the acute stage after acute traumatic spinal cord injury:

- methylprednisolone
- nimodipine
- naloxone.

1.7.4 Do not use medications in the acute stage after traumatic spinal cord injury to prevent neuropathic pain from developing in the chronic stage.

## 1.8 *Information and support for patients, family members and carers*

The NICE guideline on [major trauma: service delivery](#) contains recommendations for ambulance and hospital trust boards, senior managers and commissioners on information and support for patients, family members and carers.

### Providing support

1.8.1 When communicating with patients, family members and carers:

- manage expectations and avoid misinformation
- answer questions and provide information honestly, within the limits of your knowledge
- do not speculate and avoid being overly optimistic or pessimistic when discussing information on further investigations, diagnosis or prognosis
- ask if there are any other questions.

1.8.2 The trauma team structure should include a clear point of contact for providing information to the patients, their family members and carers.

1.8.3 Make eye contact and be in the patient's eye line to ensure that you are visible when communicating with this person to avoid them moving their head.

1.8.4 If possible, ask the patient if they want someone (a family member, carer or friend) with them.

- 1.8.5 If the patient agrees, invite their family member, carer or friend into the resuscitation room. Ensure that they are accompanied by a member of staff and their presence does not affect assessment, diagnosis or treatment.

## Support for children and vulnerable adults

- 1.8.6 Allocate a dedicated member of staff to contact the next of kin and provide support for unaccompanied children and vulnerable adults.
- 1.8.7 Contact the mental health team as soon as possible for patients who have a pre-existing psychological or psychiatric condition that might have contributed to their injury, or a mental health problem that might affect their wellbeing or care in hospital.
- 1.8.8 For a child or vulnerable adult with spinal injury, enable their family members and carers to remain within eyesight if appropriate.
- 1.8.9 Work with family members and carers of children and vulnerable adults to provide information and support. Take into account the age, developmental stage and cognitive function of the child or vulnerable adult.
- 1.8.10 Include siblings of an injured child when offering support to family members and carers.

## Providing information

- 1.8.11 Explain to patients, family members and carers what is wrong, what is happening and why it is happening. Provide:
- information on known injuries
  - details of immediate investigations and treatment, and if possible include time schedules
  - information about expected outcomes of treatment, including time to returning to usual activities and the likelihood of permanent effects on quality of life, such as pain, loss of function or psychological effects.
- 1.8.12 Provide information at each stage of management (including the results of imaging) in face-to-face consultations.

- 1.8.13 Document all key communications with patients, family members and carers about the management plan.

### *Providing information about transfer from an emergency department*

- 1.8.14 For patients who are being transferred from an emergency department to another centre, provide verbal and written information that includes:
- the reason for the transfer
  - the location of the receiving centre and the patient's destination within the receiving centre. Provide information on the linked spinal cord injury centre (in the case of cord injury) or the unit the patient will be transferred to (in the case of column injury or other injuries needing more immediate attention)
  - the name and contact details of the person who was responsible for the patient's care at the receiving centre
  - the name and contact details of the person who was responsible for the patient's care at the initial hospital.

## *1.9 Documentation in pre-hospital and hospital settings*

The NICE guideline on [major trauma: service delivery](#) contains recommendations for ambulance and hospital trust boards, senior managers and commissioners on documentation within trauma networks.

### **Recording information in pre-hospital settings**

- 1.9.1 Record the following in people with suspected spinal injury in pre-hospital settings:
- <C>ABCDE (catastrophic haemorrhage, airway with in-line spinal immobilisation, breathing, circulation, disability [neurological], exposure and environment)
  - spinal pain
  - motor function, for example hand or foot weakness
  - sensory function, for example altered or absent sensation in the hands or feet



- priapism in an unconscious or exposed male.

1.9.2 If possible, record information on whether the assessments show that the person's condition is improving or deteriorating.

1.9.3 Record pre-alert information using a structured system and include all of the following:

- the patient's age and sex
- time of incident
- mechanism of injury
- injuries suspected
- signs, including vital signs and Glasgow Coma Scale
- treatment so far
- estimated time of arrival at emergency department
- special requirements
- the ambulance call sign, name of the person taking the call and time of call.

## Receiving information in hospital settings

1.9.4 A senior nurse or trauma team leader in the emergency department should receive the pre-alert information, and determine the level of trauma team response according to agreed and written local guidelines.

1.9.5 The trauma team leader should be easily identifiable to receive the handover and the trauma team ready to receive the information.

1.9.6 The pre-hospital documentation, including the recorded pre-alert information, should be quickly available to the trauma team and placed in the patient's hospital notes.

## Recording information in hospital settings

- 1.9.7 Record the items listed in recommendation 1.9.1 as a minimum, for the primary survey.
- 1.9.8 Record the secondary survey results, including a detailed neurological assessment and examination for any spinal pain or spinal tenderness.
- 1.9.9 If spinal cord injury is suspected in people aged over 4 years, complete an ASIA chart (American Spinal Injury Association) as soon as possible in the emergency department, and record:
- vital capacity for people over 7 years
  - ability to cough.
- 1.9.10 One member of the trauma team should be designated to record all trauma team findings and interventions as they occur (take 'contemporaneous notes').
- 1.9.11 The trauma team leader should be responsible for checking the information recorded to ensure that it is complete.

## Sharing information in hospital settings

- 1.9.12 Follow a structured process when handing over care within the emergency department (including shift changes) and to other departments. Ensure that the handover is documented.
- 1.9.13 Ensure that all patient documentation, including images and reports, goes with the patient when they are transferred to other departments or centres.
- 1.9.14 Produce a written summary, which gives the diagnosis, management plan and expected outcome and:
- is aimed at and sent to the patient's GP within 24 hours of admission
  - includes a summary written in plain English that is understandable by patients, family members and carers
  - is readily available in the patient's records.

## 1.10 Training and skills

**These recommendations are for ambulance and hospital trust boards, medical directors and senior managers within trauma networks.**

- 1.10.1 Ensure that each healthcare professional within the major trauma service has the training and skills to deliver, safely and effectively, the interventions they are required to give, in line with this guideline and the NICE guidelines on [non-complex fractures](#), [complex fractures](#) and [major trauma](#).
- 1.10.2 Enable each healthcare professional who delivers care to patients with trauma to have up-to-date training in the interventions they are required to give.
- 1.10.3 Provide education and training courses for healthcare professionals who deliver care to children with major trauma that include the following components:
- safeguarding
  - taking into account the radiation risk of CT to children when discussing imaging for them
  - the importance of the major trauma team, the roles of team members and the team leader, and working effectively in a major trauma team
  - managing the distress that families and carers may experience and breaking bad news
  - the importance of clinical audit and case review.

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<sup>[1]</sup> At the time of publication (February 2016), neither intranasal diamorphine nor intranasal ketamine had a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

## Context

Spinal injury usually involves a fracture of the spinal column, which sometimes leads to spinal cord injury. The main causes of spinal injury are road traffic collisions, falls, violent attacks, sporting injuries and domestic incidents. Although spinal injury affects all ages, young and middle-aged men and older women tend to be the populations at highest risk. Approximately 1000 people sustain a new spinal cord injury each year in the UK. These injuries are associated with serious neurological damage and can result in paraplegia, tetraplegia or death. Currently there are no 'cures' for spinal cord injury and in the UK there are 40,000 people living with long-term disabilities as a result of such injuries.

This guideline covers the assessment, imaging and early management of people (adults and children) with spinal column or spinal cord injury secondary to a traumatic event. It includes the following key clinical areas:

- initial triage and management by pre-hospital care staff
- acute stage clinical assessment and management
- acute stage imaging
- timing of referral and the criteria for acceptance by tertiary services
- information and support needs of patients and their families and carers
- documentation
- training and skills.

The guideline does not cover spinal injury that is caused by a disease, rather than a traumatic event.

## More information

You can also see this guideline in the NICE pathway on [trauma](#).

To find out what NICE has said on topics related to this guideline, see our web page on [injuries, accidents and wounds](#).

See also the guideline committee's discussion and the evidence reviews (in the [full guideline](#)), and information about [how the guideline was developed](#), including details of the committee.

## Recommendations for research

The guideline committee has made the following recommendations for research.

### *1 Neuropathic pain relief*

Does early treatment with a centrally acting analgesic (for example pregabalin) reduce the frequency or severity of neuropathic pain in people with spinal cord injury?

#### **Why this is important**

Neuropathic pain occurs in 40% of people with spinal cord injury. It can be severe and disabling, and in people with spinal cord injury it can lead to further impairment of function. Having neuropathic pain can also result in increased care needs and costs of care, and make it difficult to find employment. It also increases the risk of significant depressive illness and suicide. Research is needed to address whether early treatment of spinal cord injury with a centrally acting analgesic such as pregabalin might reduce the frequency or severity of neuropathic pain.

### *2 Cervical spine dislocation*

What is the clinical and cost effectiveness of emergency reduction of cervical spine dislocations following acute traumatic cervical spine injury?

#### **Why this is important**

Half of all traumatic spinal cord injuries involve the cervical spinal cord, and a large proportion of these are caused by cervical spine dislocation. Cervical spinal cord injury caused by traumatic cervical spine dislocation produces permanent disability. The greater the permanent neurological impairment the greater the disability. A high level of disability is associated with less independence, fewer opportunities for a full life, reduced prospects for employment and a shorter life expectancy. Any intervention that improves the neurological outcome in this group of people will improve all of these adverse outcomes.

### *3 Thoracic and lumbosacral assessment tool*

After injury, what is the best method of clinical assessment to determine who needs imaging of the thoracic and lumbar spine to exclude injury to the spinal column or cord, and who is safe to discharge without risk of missing significant injury?

## Why this is important

Injuries to the thoracic and lumbar spine are associated with significant morbidity and can be associated with relatively minor mechanisms of injury. This is a particular problem in older people where such injuries can have a significant impact on their mobility, functional status and level of independence.

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