



Queensland
Trauma Education

SPINAL TRAUMA

Cervical Spine Trauma

Immersive Scenario

Facilitator resource kit

CSDS



Clinical Skills Development Service



Queensland
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Queensland Trauma Education

The resources developed for Queensland Trauma Education are designed for use in any Queensland Health facility that cares for patients who have been injured as a result of trauma. Each resource can be modified by the facilitator and scaled to the learners needs as well as the environment in which the education is being delivered, from tertiary to rural and remote facilities.

Developed by

Dr Frances Williamson, Staff Specialist – MNHHS

Reviewed by

Tracey McLean, Nurse Educator – Simulation, CSDS

Education Working Group, Statewide Trauma Clinical Network – Clinical Excellence Queensland

Queensland Trauma Education

**Spinal Trauma – Cervical Spine Trauma: Immersive scenario – Facilitator resource kit
Version 1.0**

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About this training resource kit

This resource kit provides the learner with the skills and knowledge to manage a patient with a suspected spinal cord injury.

National Safety and Quality Health Service (NSQHS) Standards



Target audience

Emergency department medical and nursing clinicians.

Duration

45 minutes, including debrief.

Group size

4-6 participants (or team composition applicable to local area).

Learning objectives

By the end of this session the participant will be able to:

- Identify a clinical syndrome associated with cervical spine injury
- Perform emergent management of complications from cervical spinal cord injury

Facilitation guide

1. Facilitator to provide further reading information to the participants.
2. Facilitator to discuss the pre-simulation briefing and deliver the immersive scenario on cervical spine trauma.
3. Utilise the supporting documents to maximise the learning throughout immersive scenario.
4. Utilise the debriefing guide to evaluate participant performance and provide feedback.

Supporting resources

- Venous blood gas
- Imaging studies

Overview of spinal injury following trauma

Spinal injury is uncommon following trauma but may have devastating consequences if not identified (1).

46% of traumatic spinal cord injury occurs following land transport crashes and 21% following high falls (2).

Injuries to the spinal cord will result in varied clinical picture depending on the level of the injury. Breathing and ventilation may be affected with involvement of high cervical spinal level due to innervation of the diaphragm by the cervical nerves 3-5. This may manifest as inability to cough, hypoventilation, and respiratory distress.

Injury above the level of T6 may lead to neurogenic shock with bradycardia and hypotension.

Further reading

Spinal Trauma	
Publication	Trauma Victoria - Spinal Trauma-Key Messages
Link	bit.ly/3qT4bjS

Simulation event

This section contains the following:

1. Pre-simulation briefing poster
2. Immersive scenario
3. Resource requirements
4. Handover card
5. Scenario progression
 - a. State 1
 - b. State 2
 - c. State 3
6. Supporting documents
7. Debriefing guide

Pre-simulation briefing

Establishing a safe container for learning in simulation



1

Clarify objectives, roles and expectations

- Introductions
- Learning objectives
- Assessment (formative vs summative)
- Facilitators and learners' roles
- Active participants vs observers

2

Maintain confidentiality and respect

- Transparency on who will observe
- Individual performances
- Maintain curiosity



3

Establish a fiction contract

Seek a voluntary commitment between the learner and facilitator:

- Ask for buy-in
- Acknowledge limitations

4

Conduct a familiarisation

- Manikin/simulated patient
- Simulated environment
- Calling for help

5

Address simulation safety

Identify risks:

- Medications and equipment
- Electrical or physical hazards
- Simulated and real patients

Note: Adjust the pre-simulation briefing to match the demands of the simulation event, contexts or the changing of participant composition.

Immersive scenario

Type	Immersive scenario
Target audience	Emergency medical and nursing clinicians
Overview	Spinal cord injury following trauma with evidence of ventilatory and haemodynamic involvement.
Learning objectives	<ul style="list-style-type: none">• Recognition of clinical features consistent with spinal cord injury following trauma.• Commence appropriate initial management for ventilatory and haemodynamic support.
Duration	45 minutes, including debrief

Resource requirements

Physical resources

Room setup	Resuscitation bay
Simulator/s	3G SimMan or ALS manikin
Simulator set up	<ul style="list-style-type: none"> • Street clothes lying supine • Moulage: normal patient • Cervical collar
Clinical equipment	<ul style="list-style-type: none"> • Resuscitation medications • Oxygen therapy • IDC equipment
Access	2 x PIVC setups with no IV stickers attached
Other	ED chart & relevant paperwork

Human resources

Faculty	2 facilitators (Dr/Nurse with debriefing experience) to take on roles of scenario commander and primary debrief
Simulation coordinators	<ul style="list-style-type: none"> • Standardised patient – facilitators to control simulated monitor • 1 x for manikin set up and control
Confederates	QAS officer
Other	1 nurse and 1 doctor in room

Handover card

Handover from ambulance officer

This is James, he is 22 years old. We were called to him after he came off his skateboard trying to make a jump at the local skatepark. Witnesses say he landed on his head, he was wearing a helmet and was not knocked out.

Immediately he complained of not being able to move his arms or legs and can't feel his legs. We are concerned he has a spinal injury.

His vital signs are normal: HR 70, BP 100/80mmHg, Sats 99% RA and RR 14. He is afebrile, BSL 6.3.

We have administered 5mg IV morphine for pain in his neck, he has a cervical collar on, and spinal precautions have been maintained.

James has no past medical history, does not use regular medications, and has no allergies. He uses occasional THC and alcohol on weekends.

Scenario progression

STATE 1: Initial Assessment				
Vital signs		Script	Details	Expected actions
ECG	SR	James: I can't feel my legs- what's going on?	Primary survey results A: intact, cervical collar, mid cervical tenderness, anterior neck exam normal B: equal BS, nil crepitus/sub cut emphysema C: pink and warm peripherally D: GCS 14 (E4,V5,M6) able to obey commands shrugging shoulders and weak elbow flexion, sensation level at T4), PEARL 2mm E: normothermia	<input type="checkbox"/> Commence Primary Survey <input type="checkbox"/> Recognise abnormal neurological examination
HR	70			
SpO ₂	99% RA			
BP/ART	100/80mmHg			
RR	14			
Temp	36.5			
BGL	6			
GCS	15			

STATE 2: Secondary Survey and Investigations				
Vital signs		Script	Details	Expected actions
ECG	SR	James: I am finding it hard to breathe	Secondary survey results Neurological assessment: Sensory level T4, motor level C5/6 Abdominal breathing pattern Results CXR: normal PXR: normal CT Cervical Spine Lateral: Unstable C6 flexion tear drop type fracture. 5mm fracture retropulsion with narrowing of the cervical canal	Secondary survey <input type="checkbox"/> Formal neurological assessment Recognition of spinal cord injury and likely level with effect on respiratory and cardiovascular systems Investigations <input type="checkbox"/> Trauma blood panel <input type="checkbox"/> Plain XR imaging <input type="checkbox"/> CT trauma scan Management <input type="checkbox"/> Increase FiO ₂ /consider HFNP <input type="checkbox"/> Provide fluid bolus +/- vasopressor support <input type="checkbox"/> Apply spinal precautions <input type="checkbox"/> Insert IDC
HR	60			
SpO₂	90% RA			
BP/ART	90/60mmHg			
RR	8			
Temp	35.5			
BGL	6			
GCS	15			

STATE 3: Ongoing Management				
Vital signs		Script	Details	Expected actions
ECG	SR	James My breathing feels a bit better now	Improvement with haemodynamic and respiratory support	Assessment <ul style="list-style-type: none"> <input type="checkbox"/> Reassess post interventions- improved saturations and BP Management <ul style="list-style-type: none"> <input type="checkbox"/> BP improves post fluid bolus/vasopressor support <input type="checkbox"/> Ventilatory function improves with respiratory support <input type="checkbox"/> Recognition of high-risk spinal level and need for ICU management/intubation for transfer <input type="checkbox"/> Supportive care - maintain normothermia, electrolytes, consider pressure area care and nutrition <input type="checkbox"/> Psychological support for patient
HR	60			
SpO₂	97% 15LNRB			
BP/ART	100/70mmHg			
RR	8			
Temp	36			
BGL	7			
GCS	15			

Supporting documents

The following supporting documents are provided for this case discussion:

1. Venous Blood Gas (VBG)
2. Chest Xray (Normal)
3. Pelvis Xray (Normal)
4. CT Cervical Spine Lateral (Abnormal: Unstable C6 flexion tear drop type fracture. 5mm fracture retropulsion with narrowing of the cervical canal)

VBG

Arterial		Temp.	37.0	Degree C	Na	140	mmol/L	
Airway	Unknown	Corr pH	7.38		K	3.5	mmol/L	
FI02	0.21	Corr pCO2	44	mmHg	Cl	106	mmol/L	
pH	7.38	Corr pO2	98	mmHg	Anion Gap	8	mmol/L	
pCO2	44	mmHg	Total Hb	130 L	g/L	Creatinine	umol/L	
pO2	98	mmHg	Oxy Hb	95	%	Ca (Ionised)	1.19	mmol/L
O2 Sat.	97	%	Carboxy H	0.6	%	Glu	5.8	mmol/L
p50	27.0	mmHg	Met Hb	1.3	H %	Lact	1.4	mmol/L
HCO3-	26	mmol/L	Sulph Hb			Bili (Total)	umol/L	
ABE	0.6	mmol/L				Fetal Hb	%	
Comp. Val.	Yes	MODE 1			MODE 2			
COMMENT:								

CXR



Pelvic XR



CT Cervical Spine



Debriefing guide

Scenario objectives

- Recognition of clinical features consistent with spinal cord injury following trauma
- Commence appropriate initial management for ventilatory and haemodynamic support

Example questions

Exploring Assessment

- What are the features of spinal cord injury, as differs from spinal column injury?
- What leads to the respiratory distress in patients with cervical spine injury?
- What causes the hypotension and bradycardia in this setting?

Discussing Management

- What are the priorities in management with suspected or confirmed spinal cord injury?
- What options are there for ventilatory support? What prompts progression to intubation?
- How can the patient's blood pressure be improved?

Crisis resource management

- How do you allocate roles in receiving and managing trauma patients?
- When prioritising the interventions how is this communicated to the team?

Key moments

- Spinal precautions
- Clinical examination features of spinal cord injury
- Management of ventilatory and circulatory distress following spinal cord injury

Acronyms and abbreviations

Term	Definition
THC	Tetrahydrocannabinol
QAS	Queensland Ambulance Service
HFNP	High flow nasal prongs
IDC	Indwelling catheter

References

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Visit csds.qld.edu.au/qte

Email CSDS-Admin@health.qld.gov.au

Phone [+61 7 3646 6500](tel:+61736466500)

