SPINAL INJURIES
BEST PRACTICE

For Adult Patients in North Wales
(by the MULTIDISCIPLINARY team)

In collaboration with

Midland Centre for Spinal Injuries (Oswestry)

&

North West Regional Spinal Injuries Centre (Southport)
Foreword

Approximately 50% of traumatic spinal cord injury (SCI) referrals can have their transfer to a specialist SCI centre delayed for a period of time due to their predisposing injuries, fitness to travel, critical care needs or the non-availability of a specialist bed.

The SCI Link-Worker scheme was developed in 1998 to provide local service managers with the opportunity to develop a more appropriate appreciation of the needs of SCI patients by informing local care provision and decision-making through the development, interpretation and dissemination of appropriate evidence-based guidelines.

The SCI-Link Critical Care Forum was inaugurated at a meeting in Sheffield on 20th November 2003. It aims to review issues of principal concern to Health Care Practitioners managing patients with SCI within Critical Care environments outside of specialist SCICs. In July 2004 the SCI-LINK Critical Care Working Party representing a range of UK adult, paediatric and neurosurgical critical care units and their associated SCI centres began working with the NHS Modernisation Agency and regional representatives of the Intensive Care Society (ICS) began work on the first draft of a Care Bundle for Spinal Cord Injury patients admitted to Critical Care environments outside of specialist SCI Centres. This work followed the development by the ICS of other care bundles for ventilated patients and many lessons were learned along the way (e.g. the correct use of gastric protection agents, procedures for clearing the cervical spine and the angle to which a patient’s head can be raised) which emphasised the need for critical care practitioners to anticipate conflicts in care requirements when care bundles are running in parallel so that avoidable omissions or errors do not occur.

Care bundles have the potential to ensure that the care of the SCI patient in a pre-transfer critical care environment will compliment that which will be delivered during the months of extensive rehabilitation that will follow.

At this time, the SCI Care Bundle is being piloted by regional adult and paediatric critical care networks in Eastern and North-West England and London. The SCI care bundle has also been incorporated into the national Neurosciences Benchmarking Project.

The care bundle for the North-West Midlands Critical Care Network is another example of collaboration between critical care providers and SCI specialists.

As soon as the ICS has approved a ‘national’ care bundle standard, all UK critical care environments will be able to move towards delivering the best care for SCI patients. In addition, the Spinal Injuries Association (SIA) will incorporate this national care bundle in the second edition of its Managing Spinal Cord Injury: Critical Care book to support the teaching and delivery of appropriate and collaborative care for SCI people in critical care.

‘Rehabilitation is a continuous process, beginning at the moment of injury, and is an integral part of critical care. If critical care and rehabilitative care are not combined, people with spinal cord injuries are subject to serious clinical and economic consequences that could otherwise have been prevented’ (Oakes D. (1990) Benefits of an early admission to a comprehensive trauma centre for patients with SCI. Archives of Physical Medicine and Rehabilitation. 72: 637 – 643).

Paul Harrison
Clinical Development Officer
Princess Royal Spinal Injuries and Neurorehabilitation Centre
Northern General Hospital
Sheffield Teaching Hospitals NHS Foundation Trust
Footnote:
Because of the success of previous care bundle work in Wales and the teachings of bundle definitions i.e. small, straightforward set of evidence-based practices — generally three to five — that, when performed collectively and reliably, have been proven to improve patient outcomes the North Wales Critical Care Network Spinal Injuries Group has agreed to call this document Spinal Injuries ‘Best Practice’.

The philosophy of this ‘Best Practice’ needs to remain the same though. Each element needs to be implemented together and consistently (unless contraindications exclude the element).

This document is a collaboration between spinal experts from Midland Centre for Spinal Injuries, Oswestry (MCSI) and North West Regional Spinal Injuries Centre (Southport) and, as such, will mean that care provided to patients in North Wales is consistent with the best practices in both of these specialist units.

The North Wales Critical Care Network wish to thank these teams, but in particular Alison Lamb, Tony Ward and Sue Pieri-Davies for their time and expertise.
Index of Contents

Acknowledgments 5
Glossary of Abbreviations 5
Information and contact numbers 6
ELEMENT 1: Spinal Clearance 7
  Spinal Imaging in Major Blunt Trauma 8
ELEMENT 2: Referral process to a specialist centre 9
  Referral checklist 10
  Chart of Injuries 11
  Neurological Classification of SCI chart 12
ELEMENT 3: Moving and Handling 14
ELEMENT 4: Gastro-Intestinal Protection 15
ELEMENT 5: Bowel Care 16
ELEMENT 6: Bladder Care 16
ELEMENT 7: Thromboembolic Protection 17
ELEMENT 8: Cardiovascular Protection 18
ELEMENT 9: Respiratory Care 19
ELEMENT 10: Tissue Viability 20
ELEMENT 11: Management of Autonomic Dysreflexia 21
ELEMENT 12: Transferring the SCI Patient 22

References 23

Appendix 1 Spinal Care 24 Hour Check List 24
Appendix 2 SCI Referral Process for North Wales 25
Appendix 3 Positioning, Handling and Turning Guidance 26
Spinal Care Best Practice

The aim of this ‘Best Practice’ document is to provide guidance and clarification towards the management of the person with suspected or confirmed spinal column and/or spinal cord injury. There are several elements to the document each covering specific aspects of spinal injury management of the patient who is cared for outside non-specialist spinal injury centres.

Acknowledgments:

*This ‘Best Practice’ document is an adaptation of the original bundle developed in collaboration with the North West Midlands Critical Care Network and the MCSI (Oswestry).*

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With grateful thanks to the contributions from the Critical Care Teams at:
Wrexham Maelor Hospital
Ysbyty Glan Clwyd
Ysbyty Gwynedd

Glossary of Abbreviations:

ASIA American Spinal Injury Association
ICP Intracranial pressure
ICS Intensive Care Society
MCSI Midlands Centre for Spinal Injury
SIA Spinal Injury Association
SCI Spinal Cord injury
SCIC Spinal Cord injury centre
Please Read!

Spinal Care Best Practice 24 Hour Check List

When introducing the Best Practice please ensure the ‘Spinal Care Best Practice 24 Hour Check List’ (Appendix 1) is commenced to comply with national recommendations and for future audit purposes (Harrison, P. 2007. HDU/ICU Managing Spinal Injury: Critical Care, Spinal Injuries Association).

Once completed please file in the patient’s notes and ensure a copy accompanies the patient to their receiving hospital.

Further information

Further information or educational enquiries on any aspect of this Best Practice can be obtained from-

**Alison Lamb**
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Midlands Centre for Spinal Injuries
Robert Jones & Agnes Hunt Orthopaedic Hospital
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(01704 547 471)

**Sue Pieri-Davies**
Consultant AHP-Ventilatory Support
Southport Regional Spinal Injuries Centre
Southport and Formby General Hospital
Town Lane, Kew Southport PR8 6NJ
(01704 547 471)
Element One: Spinal Clearance

Rationale:
Failure to clear the spine, in particular the c-spine, can potentially risk secondary spinal cord injury. It is therefore of maximum importance that the cervical spine is cleared appropriately according to this protocol.

Action:
   a) All trauma patients with the potential for spinal injuries must have a formal documented spinal clearance before any exclusions for positioning can be made. Therefore, this protocol must be adhered to.
   
b) Determine spinal clearance before relaxing spinal precautions.
   
c) Spinal clearance must be authorised by one of the following personnel:
      ▪ Consultant Spinal Surgeon
      ▪ Consultant Orthopaedic or Neurosurgeon
      ▪ Consultant Trauma Team Leader
      ▪ Consultant Emergency Physician

   and documented clearly in the patient’s notes.
   
d) Accepted guidance should be used for Cervical spinal clearance must be measured against clinical guidelines (attached).

Exceptions: None (under ANY circumstances)

References: Advanced Trauma Life Support Guidelines (ATLS) & Intensive Care Society (ICS) Guidelines
Spinal Imaging in Major Blunt Trauma

At risk

Valid clinical assessment\(^1\)
No symptoms or signs\(^2\)

Imaging needed

Multiple trauma with cardio-respiratory instability?

Yes

CT Entire C-spine
GCS < 9
CT Entire C-spine
GCS 9-14
CT Occiput - C3 sparing thyroid
GCS 15
CT None initially

No

CT abnormal/unclear areas**
CT abdomen/pelvis (incl. L-spine)**
CT chest (incl. T-spine)**
CT entire C-spine**
CT occiput to C3 only**

<table>
<thead>
<tr>
<th>Imaging Modality</th>
<th>GCS &lt; 9</th>
<th>GCS 9-14</th>
<th>GCS 15</th>
<th>None initially</th>
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<tbody>
<tr>
<td>Plain lateral C-spine</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Plain AP C-spine</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Plain peg AP (open mouth)</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Plain 45° obliques if C7/T1 unseen</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
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<tr>
<td>Plain lateral T-spine</td>
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<td>Y*</td>
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<td>Plain AP T-spine</td>
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<td>Plain lateral L-spine</td>
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<td>Plain AP L-spine</td>
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<tr>
<td>CT occiput to C3 only**</td>
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<td>CT entire C-spine**</td>
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<td>CT chest (incl. T-spine)**</td>
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<tr>
<td>CT abdomen/pelvis (incl. L-spine)**</td>
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<tr>
<td>CT abnormal/unclear areas**</td>
<td>Y</td>
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\(^1\) GCS 15
No sedative drugs or significant alcohol
No distracting pain

\(^2\) No local swelling, tenderness or steps
No local pain
No neurological symptoms or signs

* if T- or L-spine injury possible and CT chest/abdomen not otherwise indicated
** with sagittal ± coronal reconstructions of spine
Element Two: Referral Process to a Specialist Centre

**Rationale:**
Once a spinal injury has been identified clinically or on imaging, or if the spine cannot be cleared (by routine use of the protocol), then refer the patient to the local surgeon responsible for spinal injuries. If the patient has an unstable or complex spinal column/cord injury, follow Referral Process for Spinal Injuries (Appendix 2) i.e. refer to the MCSI (Oswestry) who will direct the referrer to the appropriate person.

If transfer to either of those centres is not feasible, e.g., due to critical condition of the patient, then maintain contact with these centres for continuing advice until transfer is possible.

Patient care, prevention of complications and speed of transfer can all be enhanced through early contact with specialist spinal cord injury centres.

**Action:**
- a) Complete the Referral Checklist (page 10) **prior to** calling Spinal Cord Injury Centre.
- b) Follow Referral Process for Spinal Injuries in Appendix 2 telephoning MCSI (Oswestry) immediately a cord injury is diagnosed or within 24 hours of a written diagnosis being made.
- c) Continue to follow the remainder of the Referral Process (Appendix 2).

**Exceptions:**
- None

**List of Consultants**

**RJAH - (01691 40400)**
- Mr El Masri
- Mr Short
- Mr Osman
- Mr. Chowdhury

**Southport - (01704 547471)**
- Mr Soni
- Mr Sett
- Mr Selmi
## REFERRAL CHECKLIST

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<tr>
<td>1</td>
<td>Referring Doctor</td>
<td>Patient Details (or affix label)</td>
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<td>2</td>
<td>Referring Consultant</td>
<td>Name:</td>
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<td>3</td>
<td>Referring Hospital</td>
<td>Date of Birth:</td>
<td></td>
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<tr>
<td>4</td>
<td>Time of Call</td>
<td>Sex</td>
<td>M</td>
<td>F</td>
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**Mechanism of Injury e.g. RTA/Assault etc**

**Relevant details of injury, including level of fracture:**

**Time of Injury**

**Frankel Grade of Spinal Cord Injury**

Frankel Grade Score Definition

- A Complete loss of motor and sensory function
- B Incomplete - preserved sensation only
- C Incomplete - preserved motor (non-functional)
- D Incomplete - preserved motor (functional)
- E Complete return of all motor and sensory function, but may have abnormal reflexes

**GCS, pupils and time of arrival at A&E:**

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**Neurological Assessment on arrival:**

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**Digital Rectal Examination:**

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**Give details of any treatment given e.g. intubated/ ventilated, collar**

**Current vital signs: HR, BP, SaO₂:**

**Other significant injuries and past medical or psychiatric history, including drug and alcohol use:**

**Is patient on Warfarin, Aspirin or Clopidogrel?**

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<tr>
<th>Yes</th>
<th>No</th>
<th>Don’t Know</th>
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**Referral Clinician Tel No & Ext No:**

**Name of SpR spoken to at Specialist Centre:**

**Time of first contact with SpR:**

**Details of information given to patient and family:**

**Outcome of call - comments:**

<table>
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<tr>
<th>Patient Accepted</th>
<th>Patient Declined</th>
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**USEFUL TELEPHONE NUMBERS:**

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MCSI (Oswestry): 01691 404000  
(Ask to page Spinal Injuries Registrar/consultant on call)

North West Regional Spinal Injuries Centre  
(Southport): 01704 547471
Chart of Injuries

Indicate injuries on the diagrams below:

Chart Scheme

Please use the following symbols to represent the injuries sustained. Please write details below if necessary.

Fracture - #
Haematoma - ///////
Incision - _____
Puncture - □
Abrasion - >>>>>>
Other - write details
**Steps in Classification**

1. Determine whether there is any initial response to stimuli.
2. Determine sensory levels for light and deep touch.
3. Is sensation preserved below the level of the loss of anterior root function?
4. Is sensation preserved below the level of the loss of posterior root function?
5. Is sensation preserved below the level of anterior and posterior root function?
6. If no sensation below the level of root function, determine sensory levels for light and deep touch.
7. Determine sensory levels for light and deep touch.
8. If the patient has a motor response, determine the classification.
10. Complete a neurologic examination.

**Classification (Optional)**

**CLINICAL SYNDROMES**

**E = Normal**

- Orientation and sensory intact

**F = Flaccid**

- Flaccid paralysis
- Normal sensation

**B = Incomplete**

- Some motor function but no sensation
- Reduced or absent reflexes

**C = Incomplete**

- Some motor function and some sensation
- Reduced reflexes

**D = Incomplete**

- Flaccid paralysis with some motor function
- Reduced reflexes

**A = Complete**

- Flaccid paralysis
- Absent sensation
- Absent reflexes

**Muscle Grading**

- 0: Total paralysis
- 1: No palpable muscle contraction, full range of motion
- 2: Palpable muscle contraction, full range of motion, full force
- 3: Palpable muscle contraction, full range of motion, normal force
- 4: Palpable muscle contraction, full range of motion, reduced force
- 5: Palpable muscle contraction, full range of motion, slight force
- 6: Palpable muscle contraction, full range of motion, normal force
- 7: Palpable muscle contraction, full range of motion, increased resistance
- 8: Palpable muscle contraction, full range of motion, reduced resistance
- 9: Palpable muscle contraction, full range of motion, no palpable muscle contraction

**ASIA IMPAIRMENT SCALE**

- Canada Rehabilitation Centers
- Canada Rehabilitation
- World Report
- Canada Rehabilitation
Element Three: Moving and Handling

**Rationale:**
Patients should be moved and handled in such a way as to prevent secondary spinal cord lesions due to inappropriate mechanical forces and to prevent pressure area damage.

**Action:**

a) All patients are removed from the long spinal board within twenty minutes of arrival at the Emergency Department or as soon as possible.

b) All patients with a spinal injury are transferred from surface to surface by means of spinal board and accompanying secure head device or Scoop stretcher.

c) Spinal column alignment to be maintained throughout all turns, procedures and transfer manoeuvres.

d) All patients must be assessed for pressure area protection – seek advice from Tissue Viability Nurse as necessary (see also Element 10).

e) All patients with a spinal cord injury and/or complex and multiple spinal column injuries are managed on a spinal bed within 24hrs. Dynamic/Airflow mattresses are **not to** be used. If spinal bed not available the reason must be documented in the patient’s notes. NB. Do not use automatic turning mode on the ATALS bed.

f) All spinal cord injured patients are nursed naked in bed or with a gown laid on top. Check that gown, tapes, lines etc. etc. are free so as not to cause any pressure.

g) All patients will have a regime of 2-3 hourly spinal log roll turns established as soon as is practical following admission, and within 3 hours of admission to the unit. Patients should be left in the turned position on their side for a maximum of 3 hours, or as long as the patient tolerates it, whichever is shorter. Side tilt sufficiently to transfer sacral pressure and to assist with chest drainage. **Exception:** Consider frequency in patients with a head injury where an elevated ICP is suspected. Refer to Neuro Care Bundle:
http://www.wales.nhs.uk/sites3/Documents/753/HI%20Pathway%20%2D%20%5BFinal%5D.pdf

Liaise with the physiotherapist and refer to the manual handling guidelines. If the regime is problematic, contact MCSI (Oswestry-01691 404000) for advice. **This applies to column as well as cord injuries.**

For ventilated patients, maintain **maximum** of 15º reverse Trendelenburg (see Element 9). **Exception:** Patients with a head injury where an elevated ICP is suspected. Refer to Neuro Care Bundle (see above).

h) Unless contraindicated by other injuries, provide at least twice daily range of passive exercises of hands and feet. This will work to prevent foot drop and upper limb and finger contractures. **This should commence within the first 24hrs post injury.**

i) Block the feet to a 90º resting position, using pillows. Do not force the feet into position. **Exception:** Patients with a head injury where an elevated ICP is suspected. Position the hands on small pillows. For tetraplegic patients shoulders should be abducted and alternate arms raised at each turn (refer to Appendix 3).

**Exceptions:** Head injuries should take precedence; See paragraph g and i regarding head injured patients.
Element Four: Gastro-Intestinal Protection

Rationale:
Patients are at increased risk of mucosal ulceration due to vagal over activity (in the high lesion patient) also there is an increased risk of abdominal distension resulting in splinting of the diaphragm. Acute spinal cord injured patients present with a transient paralytic ileus. Therefore, gut peristalsis must be nurtured, or patients will have potential to aspirate.

Action:
   a) All spinal cord injured patients are commenced onto a protein pump inhibitor (PPI) on admission until discharge to a Spinal Cord Injury Centre.

   b) All spinal cord injured patients are kept nil by mouth for at least 48hrs. Light diet, enteral or parenteral feeding introduced gradually thereafter, providing bowel sounds are present.

   c) All spinal cord injured patients must be referred to a dietician for assessment and nutritional support within 48hrs.

Exceptions: If a spinal cord injured patient has accompanying abdominal or head injury or surgery, introduction of feeding should be managed at the discretion and on the advice of the relevant consultant surgeon.
Element Five: Bowel Care

Rationale:
Acute spinal cord injured patients will present on admission with definitive neurological bowel dysfunction. Failure to appropriately care for the bowel function could seriously affect the patient’s bowel rehabilitation and quality of life.

Action:
  a) A digital rectal examination must be performed on all spinal cord injured patients in the Emergency Department by the attending clinician with the following recorded in the patient documentation:
     • The anal sphincter status and presence of bulbocavernosus reflex.
  b) All spinal cord injured patients should have a bowel regime instigated on admission which can be modified according to individual response.

Advice can be gained from Nurse in Charge on Wrekin Ward, MCSI (Oswestry-01691 404000)

For Guidelines for Neurogenic Bowel Management in Adults after Spinal Cord Injury please see:

Exceptions: Contraindicative injury or disorder.
  Abdominal trauma
  Perianal trauma modified to the patient

Element Six: Bladder Care

Rationale:
Acute spinal cord injured patients present with definitive neurological bladder dysfunction. The paralysed bladder is at significant risk of nosocomial infection. It is therefore of paramount importance to prevent bladder distension and catheter blockage.

Action:
  a) All spinal cord injured patients should be catheterised on admission with a size 12 –16 gauge catheter.
  b) Indwelling catheters should be maintained on free drainage and changed weekly.
  c) Once the patient is stable and fluid balance is within acceptable limits remove catheter and commence 4 hourly intermittent catheterisation. For prevention of hospital acquired infection regular intermittent catheterisation is advised.
  d) All spinal cord injured patients have an individualised bladder care programme in relation to their injury.

Advice can be gained from Nurse in Charge on Wrekin Ward, MCSI (Oswestry-01691 404000)


Exceptions: There are no exceptions unless on the advice of the MCSI (Oswestry).
Element Seven: Thromboembolic Protection

**Rationale:**
Enforced bed rest and systemic paralysis increases the risk of thromboembolism. To prevent deep vein thrombosis or pulmonary embolus, anticoagulation therapy must be appropriately established.

**Action:**

a) All spinal cord injured patients must be fitted with properly sized thigh length TED stockings unless leg damage precludes

b) Foot pumps or compression boots can be used, but it is important to monitor the pressure effect.

c) Pharmacological management should commence when advised by managing clinician to do so, preferably within 48hrs.

d) Physiotherapist input should be sought with a view to providing an assessment of limb movements.

e) Cannulae should be removed as soon as they are no longer clinically indicated. This will minimise the risk of thrombophlebitis and thrombus.

**Exceptions:**
- Do not apply TED stockings if the patient has lower limb external fixators, pressure ulcers, arterial disease or dermatological conditions.
- Anti-coagulations must be prescribed at the spinal surgeon’s directive. They should not be used if contra-indicated.
- *If pharmacological agents can not be administered foot pumps can be used.*
Element Eight: Cardiovascular Protection

Rationale:
Spinal cord injured patients can present with spinal shock which can compromise their cardiovascular status and stability. The underlying issue is the loss of functioning baroreceptor reflex and basal sympathetic tone in high spinal cord lesions – for this purpose all cervical and upper thoracic (above T6/7) will have a problem with bradycardia and unopposed vaso-vagal reflex in response to tracheal stimulus. This applies to those without cardiac sympathetic innervation i.e. T2 – T4/5. Also be aware that log rolling, repositioning may cause vaso-vagal stimulation. Spinal cord injured patients are not able to internally regulate their body temperature, dependent on the level and extent of injury.

Action:
   a) Ensure that a prescription for Atropine (usually 0.3–0.6mg) has been completed for use in the event of cardiac syncope or if the heart rate drops to below 35 bpm.

   b) Intravenous fluids should be administered judiciously, under the advice of the attending clinician in order to prevent fluid overload. (If unsure obtain advice from Spinal Consultant/Registrar).

   c) Monitor the patient’s core temperature closely. The patient’s actual body temperature can be as much as 1°C below normal. Utilise body warming or cooling devices cautiously. Insulate the patient and keep paralysed areas away from excess sources of heat or cooling.

   d) Ensure that guidance and advice regarding the management of the patient is passed on during interdepartmental transfers, e.g., MRI, theatre.

Exceptions:
   • None
Element Nine: Respiratory Care

**Rationale:**
Pulmonary complications can have a morbid impact for spinal cord injured patients. It is therefore important to work to promote respiratory monitoring, positioning, and improving ventilation and perfusion. Urgent referral should be made to and advice requested (as directed at referral triage by MCSI) from Southport Spinal Centre regarding initial and ongoing respiratory care. Any trial extubation should be deferred until discussed with Southport unless clearly appropriate.

**Action:**
a) All cord and column injuries should be nursed flat/supine as respiratory mechanics are maximised in the supine position for the spontaneously breathing tetraplegic patient. If necessary the bed should be tilted no more than 15° reverse Trendelenburg; this should only be adapted after multidisciplinary discussion. **Exception: Patients with a head injury where an elevated ICP is suspected. Refer to Neuro Care Bundle:**

http://www.wales.nhs.uk/sites3/Documents/753/HI%20Pathway%20%2D%20%5BFinal%5D.pdf

b) Ventilate to normal blood gases unless there is chronic underlying lung morbidity. Provide humidified supplemental oxygen, particularly in the acute phase, to ensure that the cord is kept oxygenated and reduce the risk of further damage.

c) It is essential to closely monitor the patient for signs of respiratory fatigue or distress, with regular monitoring of Vital Capacity, oxygen saturation, hypercapnia, hypoxia and respiratory rate.

d) All Patients should be referred to a physiotherapist to initiate an individualised preventative/prophylaxis regime e.g. assisted cough, incentive spirometry, non-invasive ventilation and advice regarding turning and positioning to maximise V/Q (taking account of requirements for skin integrity and care). Any issues regarding problems with clearance of secretions should be discussed with the respiratory specialists at Southport.

**Re-admission Patients**
Please contact Southport Spinal Centre (01704 547471) for advice regarding changes in ventilatory care, timing of tracheostomy placement, tracheostomy tubes etc. All units will have been provided with information relating to patients discharged home on ventilation within their community catchment area via a nominated link.

**For Guidelines for Respiratory Management after Spinal Cord Injury please see:**


**Exceptions:** Head injuries should take precedence; therefore patients with a head injury where an elevated ICP is suspected. Refer to Neuro Care Bundle:

http://www.wales.nhs.uk/sites3/Documents/753/HI%20Pathway%20%2D%20%5BFinal%5D.pdf
Element Ten: Tissue Viability

NB. This section is to be used in conjunction with:
• Betsi Cadwaladr’s or existing Tissue Viability Guidance
• NICE CG 7 (2003) Pressure Ulcer Prevention
• NICE CG 29 (2005) The Prevention and Treatment of Pressure Ulcers
• International Pressure Ulcer Prevention and Treatment (2009)

Rationale:
All spinal cord injured are at increased risk of developing pressure area sores. They will therefore require vigilant monitoring of pressure areas.

Action:
   a) Complete pressure ulcer risk assessment (e.g. Waterlow/Maelor score) must be carried out within 6 hours of admission and the findings documented in the case notes.

   b) Follow hospital guidance for documentation of findings.

   c) Initiate an appropriate turning regime (refer to the Moving and Handling element). Refer to the spinal consultant and physiotherapist for an appropriate turning regime. The regime should be individually adjusted to address combination of problems. Red marks are significant; these should be palpated for hardness and kept pressure free until they are no longer visible or palatable. The key is to ensure all pressure areas are looked at least daily, if not on each shift. Refer to the MCSI (Oswestry) and the spinal consultant for clarification and advice with regard to positioning the patient appropriately in relation to their level and extent of injury, in order to minimise the risk pressure area damage.

   d) If any splints, plaster cases or orthoses are to be used, observe the relevant pressure areas for signs of tissue damage at least 3 times a day. Obtain advice from the orthotist or the physiotherapist regarding appropriate care and application. Liaise with the orthopaedic services with regard to plaster casts.

   e) If pressure area damage is noted, contact the Tissue Viability Nurse immediately. Document the damage in the case notes, all tissue damage should be measured and be photographed, initially and then weekly thereafter. Act immediately to relieve the pressure on the damaged area.

   f) All staff must be made aware of the specific tissue viability care requirements of the spinal cord injured patient.

Collars need to be removed on a daily basis to check skin underneath and to check the occiput.

If the patient is turned high enough there should not be a problem with pressure sores developing.

Aspen collar is the collar of choice.

Exceptions: None
Element Eleven: Management of Autonomic Dysreflexia

**Rationale:**

Patients with spinal cord lesions are at risk of autonomic Dysreflexia after the spinal shock phase. This is a life-threatening hypertensive response to noxious stimuli.

a) Assess the patient for risks or history of Dysreflexia to include level of completeness, time since injury and previous symptoms.

b) Monitor the patient for signs of a Dysreflexia episode. These may include, but are not restricted to, hypertension, bradycardia, flushed face and upper extremities, stuffy nose, pounding headache and sweating.

c) Identify the noxious stimuli. Some examples of these stimuli could be a blocked or kinked catheter, UTI, impacted bowel, ingrown toenail or pressure sore. Work to resolve these immediately.

d) Elevate the bed or sit the patient up if appropriate to do so, on the advice and direction of the clinician.

e) Inform the attending clinician to initiate treatment. The treatment regime would normally include;

   • Administration of GTN spray or tablets or Nifedipine

f) Monitor cardiovascular signs continuously for resolution of the signs of Dysreflexia. Maintain heightened awareness for repeat attacks.

g) Document episode in the patient’s case notes.


**Exceptions:**

• None
Element Twelve: Transferring the SCI Patient

**Rationale:**
Safe patient transfer to the Spinal Cord Injury Centre prevents secondary complications and promotes rehabilitation prospects; this should be done at the earliest possible opportunity.

**Action:**

  b) Ensure that the Referral Checklist (page 10) and Network Transfer Form have been completed (refer to the Element 2 regarding the Referral Process page 9).

  c) Ensure the provision of appropriate transfer equipment following above guidelines.

  d) Ensure the provision of safe packaging for the patient. The patient must be aligned, secured and protected. The preference is to use a vacuum mattress. If the spinal board is to be used, ensure that pressure area protection is provided in the form of a specialised pressure blanket, or as stated preferably a vacuum mattress.

    There is a high risk of damage to pressure areas for any patient who is on a spinal board for 2 hours. *(Patient is to be placed onto the spinal board on arrival of the ambulance crew and not before).*

  e) Liaise with the Spinal Cord Injury Centre prior to dispatch.

**Exceptions:**
- None
References


International Pressure Ulcer Prevention and Treatment 2009.

Multidisciplinary Association of Spinal Card Injury Professionals (MASCIP) Moving and Handling Patients with Actual or Suspected Spinal Cord Injuries).
http://www.mascip.co.uk/pdfs/MHO%200289%20SIA%20web1.pdf


North Wales Critical Care Network Adult Severely Brain Injured Pathway (including Neuro Care Bundle).
http://www.wales.nhs.uk/sites3/Documents/753/HI%20Pathway%202D%205BFinal%5D.pdf


### Appendix 1

Patient Address Label

Spinal Care Best Practice 24 Hour Check List

<table>
<thead>
<tr>
<th>Please Tick</th>
<th>Sign &amp; Print Name</th>
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- Appropriate Spinal Imaging Completed *(Refer to element 1)*
- Refer to a Spinal Cord Injury Centre *(Refer to element 2)*
- Turning Regime initiated within 3 hours *(Refer to element 3)*
- Commence Protein Pump Inhibitors Refer to a dietician *(Refer to element 4)*
- Perform a Digital Rectal Examination
  - Faeces Present
    - No
    - Yes
    - Removed
- Bowel program initiated *(Use information in element 5)*
- Catheterise Patient *(Use information in element 6)*
- Put on thigh leg TED stocking *(Use information in element 7)*
- Prescribe patient atropine if applicable to level of injury *(Use information in element 8)*
- Refer to physiotherapist *(Use information in element 9)*
- Complete a Pressure Risk Assessment *(Use information in element 10)*

**If you need to transfer the patient refer to element 12**

**PLEASE FILE IN THE PATIENTS NOTES and ENSURE A COPY ACCOMPANIES THE PATIENT TO THEIR RECEIVING HOSPITAL**
North Wales Critical Care Network

Spinal Cord Injury (SCI) Triage for North Wales

SCI without life threatening / severe head injuries, not requiring respiratory support
Contact MCSI Medic on-call
24hr Cover

- Clarify Referral
- Place patient on waiting list
- Admit within 72hrs
- Unable to Admit within 72hrs
- Deteriorating neurology
- Asses clinically MRI urgently

Unconscious (GCS≤8) 2º trauma/suspect Head Injury – follow Severe Head Injury Pathway (Contact Walton Centre) 24hr Cover

- Clarify advice only
- Transferred to Walton
- Repatriated
- Refer to Walton or Spinal Surgeons MCSI

SCI requiring respiratory support
Contact MCSI Medic on-call
24hr Cover

- Not transferred to Walton
- Contact MCSI
- MCSI will triage referral & advise

Request Visit by Nurse Consultant/Community Coordinators/Consultant in SI to offer support from MCSI until transfer to MCSI (or Southport)
Appendix 3  Positioning, Handling and Turning Guidance

**ADAPTED ATLS HEAD HOLD FOR ACTUAL OR POTENTIAL CERVICAL SPINAL INJURY**

*Advanced trauma life support manual and training stipulate a standardized approach to head holding in the event of actual or suspected spinal injury. The healthcare worker responsible for head holding is designated as the Team Leader and directs all patient movement. However, the degree of lateral flexion experienced by the Team Leader during longitudinal is excessive and this represents an adaptation of the current technique as recommended by American College of Surgeons’ Committee on Trauma (ACoS) (2009) Advanced Trauma Life Support Manual for Physicians (6th edition). American College of Surgeons Press, Chicago.*

1. Explain to the patient what is happening and why. A suitably qualified and experienced healthcare worker will be designated as the Team Leader. The Team Leader positions self at top of trolley / bed, placing hands either side of patient's head. With fingers spread wide, slides both hands downwards to the thumb rests either below the jaw or above the clavicle and the fingers are spread behind the neck encompassing CT. If sandbags / headblocks are present an assistant removes them. One at a time and the Team Leader brings each hand into position individually. Forearms are then brought together either side at the back of the head.

2. Prior to rolling the patient, care must be taken to position the neck height at optimum level to reduce excessive forward flexion of the Team Leader. Patient is then rolled on the command of the Team Leader. To accommodate this roll, Team Leader may be required to adopt a side flexed position. Note fingers crossed behind cervical spine as described above.

3. In order to maintain a comfortable head hold during the lift, the Team Leader releases top hand and maintaining contact with the skin throughout, moves hands slowly to the top of the patient’s head with fingers spread wide. They should then adjust their base of support (feet and legs) to a more comfortable and sustainable position while maintaining the head in the aligned position.

4. Shows adapted ATLS head hold from the opposite side showing alignment nose – chin – sternum. A chair can be made available for the Team Leader to sit down during prolonged holding to enable the allows to be rested on a pillow. The Team Leader must be aware that they are allowed to return the patient to the supine position if they feel the strain of maintaining the turn becomes excessive and beyond their limitations. In patients with broad shoulders, a pillow or pad can be used to support the Team Leader’s underlying arm but it must be of the correct depth to maintain spinal alignment.

Reference: Moving and Handling Patients with Actual or Suspected Spinal Cord Injuries: For full and further guidance please see:
http://www.mascip.co.uk/pdfs/MHO%200289%20SIA%20web1.pdf
ACUTE TETRAPLEGIC SPINAL LOGROLL – Method 1

During an acute tetraplegic logroll the patient's head and vertical column must be kept in alignment when rolling from supine to side-lying and vice versa. During this manoeuvre the alignment of the vertical column and the body as a whole is maintained through the manual support provided by the tending team. 1st assistant – Team leader & acute head held in accordance with adapted ATLS procedure; 2nd assistant – shoulder level; 3rd assistant – hip level; 4th assistant – lower leg level; 5th assistant – operating the bed controls, supporting arms, checking patient's skin, placing pillows in situ etc.

1. Logrolling on a trolley in the Emergency Department or within a ward setting on a normal hospital bed or tilt and turn bed is essential to enable examination of the back and necessary for relieving pressure on the skin, hygiene, bowel care and postural chest drainage. The following technique is applicable in all clinical settings.

2. Team leader undertakes acute initial head held in accordance with adapted ATLS procedure. 4th assistant passively positions patient’s arms across chest but above diaphragm. This is important as the arms are paralysed and may fall down causing injury to the shoulder joint.

3. 2nd assistant reaches over patient. First hand on shoulder and second hand on top of hip. 5th assistant supports patient’s arm during this action.

4. 3rd assistant positions hands. First hand at hip level alongside the 2nd assistant, and second hand underneath furthest thigh.

5. 4th assistant positions hands. First hand under the knee of the furthest leg, and second hand under the ankle of the same leg.

6. Close up of hand positions – ensure all parties are in contact with the patient’s natural skeletal landmarks and not just adipose tissue.
MECHANISED TURN FOR POSTURAL CHANGE

The availability of a mechanical turning bed can enhance the experience of turning in alignment for patients with actual or suspected spinal injury. This is particularly beneficial for tetraplegic patients, patients with multiple trauma and acute onset complications, as well as for patients whose body mass places a significant risk for staff during routine manual turning. 2nd assistant - Team leader & initial head hold in accordance with standardised ATLS procedure; 2nd assistant - shoulder level; 3rd assistant - hip level; 4th assistant - operating the bed controls, supporting arms, checking patient's skin, placing pillows in situ etc.

Team leader undertakes acute initial head hold in accordance with adapted ATLS procedure, 2nd assistant provides contact guard against inappropriate patient movement, 3rd assistant positions pillow between the legs to maintain hip abduction.

2nd and 3rd assistant provide contact guard (counter traction) against inappropriate movement of the patient during mechanical turning of the bed. Team leader gives the command when all the team are in position to commence the turning of the bed.

4th assistant checks inclinometer fitted to the bed and sets the bed to the required degree of tilt.

Team insert pillows under both arms and legs for patient comfort and alignment.

Legs are positioned to prevent hyperextension of the knees, a bed end is placed in situ and additional pillows placed at the end of the bed to support the patient's feet in neutral to prevent foot drop. The heels are left 'floating' free from pressure to prevent skin breakdown (not illustrated).
POSTURAL ALIGNMENT

Physical landmarks are visualised to demonstrate postural alignment of the spine during turning and positioning of SCI patients.

1. During all patient movements all commands come from the team leader who also takes responsibility for monitoring the physical alignment of the patient's spine during and after turning and transfer procedures by monitoring the alignment of body landmarks.

2. From their sit-up position at the patient's head they can monitor the alignment of the nose, sternum and pubic symphysis. They can also observe lateral alignment of shoulders, coccyx, hips and legs for signs of spinal rotation. When at rest, the head should be supported to maintain mid-line position using pads or blocks.

3. The accompanying pictures illustrate correct postural alignment of SCI patients following turning and transfer procedures. Upper limbs should be supported in a position that guards against contractures of elbow, wrist and fingers until the patient is assessed for splints.

4. Legs are positioned to prevent hyperextension of the knees, a bed end is placed in situ and additional pillows placed at the end of the bed to support the patient's feet in neutral to prevent foot drop. The heels are left floating free from pressure to prevent skin breakdown.
ASSISTED COUGH

Paralysis of the abdominal muscles cause severe impairment of forced expiration. The cough mechanism will be altered in SCI patients with a neurological level of T11 and above. The higher the level of lesion the more likely the patient will require assistance with coughing. Patients with complete cervical spinal cord lesions are at greatest risk of respiratory complications. Medical advice should always be sought first before attempting assisted coughing in new SCI patients, those with chest injuries, cardiovascular disease, abdominal trauma or diseases or who are pregnant.

Two-person technique: Clear verbal direction and co-ordination between the person(s) helping and the patient is essential for these techniques to be successful. Stand on either side of the bed. Each person places their hands on the upper and lower ribs of the same side with their fingers spread and pointing upwards and outwards. As the patient attempts to cough, push inwards and upwards simultaneously. This method may not be suitable for a patient who has an unstable spine because if the actions are not performed simultaneously it introduces rotation of the thorax.

This two-person method is preferred if spinal stability is a consideration as both people are pushing bilaterally which will minimise rotation. Stand on either side of the bed. Each person places one forearm across the upper abdomen of the patient with their other hand on the upper or lower ribs of both sides of the chest. As the patient attempts to cough, push inwards simultaneously.

Single-person technique: Spread your hands anteriorly around the lower rib cage and upper abdomen. With your elbows extended push inwards and upwards with both arms as patient attempts to cough. Arms must be kept extended for this technique to work effectively. It may therefore not be appropriate to use if the patient’s bed does not lower to a suitable height.
Neutral Supine

Complete manual turn to relieve pressure areas

Hand Position

Shoulder Release
Repositioning A Patient with HALO Brace

- Gain consent from patient if applicable.
- Check HALO secure
- Ensure trache & vent tubing secure (dedicated person).
- Roll patient onto side.
- Remove back & leg pillows.
- Insert slide sheet

- Ensure trache (dedicated person), IV lines, catheter etc secure
- Using slide sheet turn patient onto back/other side.
- Remove slide sheet

- Insert pillow into back
- Use pillows to support legs/protect vulnerable pressure areas

- Use pillows/towels to support hands
- Check occipital pressure area