Spinal Cord Injury
Care plan

Clinical care plans never replace clinical judgment. This care plan must be altered if not clinically appropriate for the individual patient

This document covers the care needs required by this client group and is **in addition** to the basic care provided as standard to all patients

Admission date	
Patient full name	
D.O.B.	
Hospital Number / NHS number	
Ward	
Local Hospital **Local Spinal cord injury center**	

Owner: RLH Spinal Working Group
Launch date: 25th November 2019
Superseded documents: Spinal care pathway C0-T8/T9 & below (2008)
Review date: April 2020

Contacts and referrals

Team Referred To	Time Standard	Contact Number
Stanmore - Spinal Injury Unit (SIU)	4 hrs for trauma ASAP for other SCI	Referrals: nww.spinalreferrals.nhs.uk Stanmore Outreach: 02089095121
After Trauma	On admission if under Trauma	**Internal**: 45639 **External**: 0203 594 5639
Spinal CNS	On admission (all SCI patients)	Bartshealth.spinalcnsteam@nhs.net Ext 45855
Physiotherapy	Within 24 hrs	**Dayteam**: As per ward contact numbers **Out of hours**: Via Switchboard
Occupational Therapy	Within 72hours	**Dayteam**: As per ward contact numbers
Speech & Language Therapy	All Cervical SCI once appropriate. All other levels as required	**Dayteam**: As per ward contact numbers
Dietician	Acute SCI: Within 72hours Chronic SCI: As nutrition screen tool indicates	**Dayteam:** As per ward contact numbers
Continence CNS	As needed	**Internal**: 42684 **External**: 0203 594 2684
Patient and Relative Service, RAID/Psychology	As indicated	RLH: RAID via CRS referral
Spinal Injury Association (SIA)	As indicated	0800 980 0501 https://www.spinal.co.uk

Guidance for completion

This document has been created for use at Barts Health NHS Trust hospital sites and has been divided into strategic sections to focus acute spinal care. It is suitable for a primary diagnosis of acute spinal cord injury, MSCC and cord infarcts. Some sections will be further explored via electronic resource folders available on the trust-shared drive. Additional appendices are incorporated within to support daily management.

This document should be used alongside the medical notes and is a multidisciplinary document. Reference should be made in the medical notes to any procedures and/or actions carried out in relation to the document as a record of key events e.g. Referrals, assessments, ASIA, etc.
The guideline/checklist has been created in ascending acuity of tasks. It will require staff to review each area on a **daily** basis to ensure tasks are completed or updated, and flag any outstanding aspects to the MDT. Staff will be expected to utilise the supporting information available in the resource folders.

Inclusion Criteria:

- This care plan should only be used if the SCI is the primary diagnosis and there are rehabilitation requirements.
- This pathway should be used for patients with acute cord injury/deficits, both trauma and non-trauma (e.g. cord infarcts).

Exclusion criteria:

- Patients with significant brain or pelvic injury, cord lesion due to metastasis (care plan can still be used as a reference for these cases).

If appropriate, care plan can be restarted at a later date, e.g. if the neurological deficit from the brain injury will not prevent participation in Spinal rehabilitation

Documentation Key

Sign	Indicates action/care ordered/administered – this should be used every time an action is completed/reviewed/ discusses
Date	Indicates when action was completed
C	Indicates continuation in care following initial assessment / review
V	Variance from the care plan If an entry is recorded as a variance, further details should be documented on appendix 7; reason for variance, any action taken and the entry signed). This enables the care of these patients to be audited. Documentation on patient notes should state that care was given as per Spinal Cord injury care plan

Documentation

- The care plan complements the medical notes and is to be used as an MDT document.
- There may still be care documented elsewhere, but **duplication should not occur**.
- Patient details and date should be filled in on every page as parts of the pathway will be repeated (or labelled)
- All members of the MDT can document – they should sign in on the signature page. All contact details and dates should be documented on the referrals page as completed.

If further information / advice is required, please contact the nurse in charge or a member of the Spinal team involved as per the documentation log.
Ascertain Immigration status of patient regarding eligibility for funding for rehabilitation – if not eligible or unsure refer to 'Paying Patient Department'

Resource folder information

For additional information on specific sections, please refer to the key resource pack:

- Box app
- Resource folder on (I:) drive
  - **Location 1:**
    - \\LNASV3\Directorates$\surgery_&_anaes\SpinalCord Injuries
  - **Location 2:**
    - \\LNASV3\Directorates$\surgery_&_anaes\ACCU\SpinalCord Injuries
  - **Location 3:**
    - \\LNASV3\Directorates$\nursing_&_therapies\THERAPIES\SpinalCord Injuries

Documentation log – to be completed by every person documenting on the care plan

NAME	ROLE	INITIAL	SIGNATURE

Section 1	Injury date: Mechanism of injury: Injury level: AIS:	Admitting team / consultant: Other significant injuries: Significant PMH: Infection control issues:

	Action	Comments and resources	Timeframe
Section 2	**Add patient onto SCI database/register for specialist input** - Liaise with primary team, Spinal CNS, after trauma or therapy team See resource folder for more information	http://nww.spinalreferrals.nhs.uk/ to register patient and trigger referral to Outreach. **Stanmore:** Spinal outreach: 02089095121 **Spinal CNS:** Support on management of SCI **After trauma:** support on overall injuries of patients	Traumatic injuries: within 4 hours Non-traumatic: as soon as possible
Section 3	**Check spinal stability and restrictions** Day of referral See resource folder for more information	Imaging completed (tick as appropriate) CT MRI CTA MRI C/ CONTRAST CT WITH CONTRAST OTHER_____ Spinal restrictions and management: -See Brace and collar proforma on CRS -Spinal team documentation on CRS for spinal precautions -Check CRS/Refer a patient for further documentation	On admission …… Following Spinal team r/v When condition changes / post-surgery/ post treatment
Section 4	**Refer to Spinal CNS** To be done on admission, for ALL spinal patients	Overall management of SCI Link between spinal consultant / family / therapies / ITU & Wards team **Contact:** Email – bartshealth.spinalcnsteam@nhs.net / referral on CRS / Ext 45855	On admission
Section 5	**Monitor for Cardiovascular stability** **Assessment and management of Neurogenic shock and Spinal Shock** See resource folder for more information	Team to: assess if patient is at risk of autonomic dysfunction ensure clear documentation when patient is in neurogenic shock or spinal shock assess daily the cessation of neurogenic shock / spinal shock Refer to spinal CNS for further assistance **Spinal shock** = areflexia or hyporeflexia + autonomic dysfunction During spinal shock patients will present with FLACCID paralysis below the injury level, distended abdomen due to gastric paralysis, absent reflexes, absent bowel sounds. Daily assessment would indicate cessation of spinal shock – monitor bowel sounds, abdomen distension, reflex assessment After cessation of spinal shock patients may no longer present flaccid paralysis. If severe spinal shock - patients to be managed on ITU **Neurogenic shock** = significant cardiovascular dysfunction (unopposed parasympathetic activity due to cessation of sympathetic activity). Usually occurs in injury above T6. Symptoms: low blood pressure, initial tachycardia followed by low heart rate. Patients to be managed on ITU **Interventions during this period:** - Target based fluid management requiring close blood pressure and CVP monitoring. Caution with over transfusion as may lead to pulmonary oedema. - Target MAP of 80 to 90 mmHg. Consider use of inotropes for improving BP and cord perfusion. - Consider prescription of sympathomimetics for symptomatic bradycardia such as Glycopyrolate. - Prevent postural drop on sitting upright using Ephedrine and abdominal binder prior to trial of sitting out.	Every shift as per ward protocol If spinal chock / neurogenic shock Date commenced …… Date resolved ……

Section 5 (cont)	**Monitor and assess risk of autonomic Dysreflexia** **Ensure patients at risk of AD (SCI T6 and above) are prescribed PRN GTN spray** More prevalent as patient comes out of neurogenic shock, often sub-acute phase. Please see appendix 1 + resource folder for further guidance	**Occurs mostly in patients with lesions at T6 or above**. Due to the loss of central control over the sympathetic nervous system, an exaggerated and unchecked response to stimuli can occur, causing extensive vasoconstriction in the large splanchnic blood vessels and a subsequent increase in BP. It is life threatening due to the risk of inter cranial haemorrhage, malignant hypertension, encephalopathy, seizures or cardiac arrhythmia. **Signs and symptoms:** Bradycardia, hypertension (at least 20 SBP higher than patient's baseline), severe pounding headache, perfuse sweating, flushing above the level of injury, chills, nasal congestion, blurred vision and shortness of breath **Common triggers:** Blocked catheter, constipation, pressure ulcer, tight clothing, stretching, FES **What to do if you suspect AD:** *** Do not put patient flat*** - Elevate the patient's head and lower their legs - Check BP and continue to measure - Call for medical assistance as they may need urgent medication, don't leave the patient - Try to identify and alleviate the cause - Loosen abdominal binders and remove any compression garments NB – Ensure patients at risk of AD are prescribed GTN spray /sublingual nifedipine – this will help lower the BP for moments whilst the cause for AD is being identified and solved	Assess every shift and manage as necessary
Section 6	**Respiratory assessment and appropriate management plan** Refer to Physiotherapist during core day hours. If respiratory deterioration out of hours Physiotherapist available via switchboard Please see appendix 2 and resource folder for further information	Aim to prevent atelectasis, ensure effective secretion clearance and minimise respiratory fatigue **<u>Full physiotherapy respiratory assessment within 24hours</u>** - With injury T12 and upwards - Any spinal level on prolonged bed rest - Any spinal level with risk factors (smoker, obesity, chest trauma/pathology, age) **<u>Assessment to include if self ventilating/non-invasively managed (NIV)</u>** - Daily supine forced vital capacity (FVC) assessment to monitor for deterioration (at least twice daily with higher frequency up to 4-6 hourly determined from acuity of injury) - If FVC is less than 1 litre (not technique related), the patient is at high risk of respiratory failure and escalated to CCOT/ACCU for close monitoring and ventilatory support considered e.g., NIV or intubation - If FVC 1L – 1.5L, prophylactic options for increasing maximal inspiratory capacity should be considered e.g. cough assist device and/or non-invasive ventilation if on ACCU - Peak cough expiratory flow (PCEF) to evaluate cough effectiveness - Close monitoring of respiratory rate and increase work of breathing - Serial chest X-rays - Blood gas e.g. ABG **<u>Overall Management to include:</u>** Prophylactic treatment essential (regardless of whether retained secretions or increased WOB): Positive pressure via non-invasively if on ACCU or cough assist device (to improve ventilation) -Manual assisted cough +/- suctioning to aid secretion clearance if not contraindicated by paralytic ileus/abdominal trauma and cough assist device programme incorporation - If unstable/uncleared T4 fracture and upwards ensure spinal stability maintained with neck stabilisation and shoulder/chest counter pressure - Ensure pre-oxygenation with all chest treatment **NEVER** position an individual with cervical SCI in the sitting position when in respiratory distress. Lying flat will assist respiratory function by enhancing sympathetic activity.	Assess: within 24 hours of admission Assess daily and manage/escalate as necessary FVC assessment date started: …….. Abdominal binder date provided: …….. Cough assist device date started: ……..

Section 7	**Neurological assessment** **Includes:** ASIA for all SCI levels ASIA + GCS on injuries above C3 Sacral segments Reflexes Please see appendix 3 + resource folder for further guidance	American spinal cord injury assessment (ASIA) provides an overview of the motor, sensory and neurological level of cord injury. It will enable patients to be classified as complete or incomplete spinal cord injury and monitor changes with intervention and recovery. **Best practice:** ASIA charting should be completed in one session as patient tolerance allows, as well as with the same person present for all testing to ensure consistency Spinal CNS/Medical team responsible for completion of sacral assessments on admission, within the first 24-72 hours, on cessation of spinal shock and when condition changes (S4/5 motor & sensory function (deep anal pressure & voluntary anal contraction) ASIA completed: - Within 72hrs of admission (clear documentation in Emergency department if - At 6 weeks or post significant medical intervention e.g. fixation/decompression/ raised cord perfusion - At 3 months of injury *A review of reflexes during should be incorporated into assessments NB - **IF THERE IS A CHANGE IN NEUROLOGY** this should be documented and reported to the medical /spinal team **IMMEDIATELY**. Please also document who this was reported to, or if unanswered attempts to contact were made. Routine spinal observations (Power and sensation) should be done by allocated nurse every 2-4 hourly	Full neurological assessment: on admission and when condition changes Routine spinal observation to be done every shift / 4 hourly by ward nurses
Section 8	**Positioning and range of movement management** Commence from 72 hours from initial assessment Please see appendix 4 + resource folder for further guidance	**<u>Be aware of spinal stability and associated precautions whilst ensuring range of movement (ROM) is not lost</u>** - Uncleared/unstable T4 and above: maintain cervical spine alignment, counter pressure for all movements and shoulder flexion at 90 degrees. - Uncleared/unstable T5 – T7: limit hip flexion to 90 degrees. - Uncleared/unstable injuries below T8 should not have their hips flexed more than 30° although 'frogging' (full external rotation of the hip with full knee flexion) should be carried out to maintain range **<u>Tone/ Spasticity management:</u>** - Monitor for the presence of spasms and tonal changes e.g. Modified Ashworth Scale. If evident and liaise with medical and therapy staff. - Consider use of positioning equipment +/- anti-spasmodics as indicated **<u>Positioning and Splinting</u>** Aims: To maintain joint range of movement and muscle length - Establish patient specific positioning chart - Passive and active assisted ROM range of motion programme to be instigated by therapist and taught to relatives as appropriate - Splint regimes should be individualised and provided by therapists as appropriate e.g. resting splints for C5 cervical level. Please link in with occupational therapy for further guidance **Progression towards seating should be reviewed and agreed regularly by the multi-disciplinary team** **<u>Be aware of Heterotopic Ossification:</u>** - The formation of bone in and around joints, common within the first few months of SCI. - Early signs include swelling and reduced ROM, +/- fever, pain and increase in spasticity - Most commonly affects shoulders, elbows, hips and knees - Increased occurrence with aggressive stretch and passive movements	Specify and date any change of spinal precautions management: 1)…….. 2)…….. 3)…….. Date of medication commencement for management: …….. Date of referral for any orthotics requests: …….. …….. Specify and date any identification: …….. ……

Section 9	**Pressure care** Commence from admission Please see appendix 4 + resource folder for further guidance	Review Waterlow score to identify pressure risk. **SSKIN Bundle** - Ensure bundle components are continually considered: **S**urface, **S**kin inspection, **K**eep moving (repositioning), **I**ncontinence and moisture, **N**utrition and hydration). **Bed** - Commence use of air mattress and use of pillows as condition allows (fixed or cleared spine). - Agree positioning chart as soon as possible (2 hourly turns if any skin marking otherwise 4 hourly & grade by 30mins every 3 days). Seek advice by physiotherapists or follow photographs provided. - Patient education and teach self pressure relief (rolling) as early as possible. **Wheelchair** - Use appropriate pressure relieving cushion dependent on Waterlow score. Complete hoist transfer always for first assessment to wheelchair or plinth/bed. - Strict graded seating plan (increase time in chair by 30-60 mins every day if pressure areas remain intact/no cardiovascular compromise) - Patient education and teach self pressure relief as early as possible. **If signs of pressure or moisture lesions** Terminate any positioning where direct pressure to that area is applied and re-establish appropriate positioning chart. Discuss same day with: - Patient's own nurse - Spinal CNS (+/- discuss if tissue viability nurse input needed) - Nurse in Charge	Weekly Every shift as per ward protocol
Section 10	**Bowel and Bladder management** Within 24 hours of initial assessment Please see appendix 5 + resource folder for further guidance	**BLADDER** - IDC on free drainage in the initial stage - Patient will present one of 3 types of neurogenic bladder - neurogenic detrusor over activity, detrusor sphincter dyssynergia, detrusor areflexia - Ensure adequate fluid intake -Regular urine dipsticks NB – Feeling the catheter tug is different from having full bladder control **BOWEL** - Neurogenic bowel management - Flaccid (injuries below T12) or Reflexic (injuries above T12) ***NB** – Spinal shock patients to be treated as flaccid (even on injuries >T12) - Please refer to MASCIP / Stanmore guidelines for further information and management - Laxatives for flaccid bowel – stimulant(senna) and osmotic (movicol / lactulose) - Laxatives for reflexic bowel – stimulant (senna), softener (sodium docusate) +/- osmotic (movicol/lactulose) and alternate day rectal stimulant (glycerine) Patients will need adequate management plan to be established ASAP – including manual manoeuvres. Bowel care to be done **DAILY** for every patients Spinal CNS team will document and advise on plan for B/B management **To be considered**: Referral to continence CNS Referral to urology regarding need for suprapubic catheter Stanmore Outreach for further advice Establish positioning and seating chart around B/B timings Consider B/B timings when scheduling therapy sessions Spinal Care Bladder and Bowel Assessment forms: - MASCIP guidelines	Every shift as per ward protocol Every shift as per ward protocol

Section 11	**Nutrition management** Referral within 48 – 72hrs if acute SCI See resource folder for more information	All patients admitted with acute SCI should be referred to the Dietitian for a nutritional assessment. Patients who cannot maintain volitional nutritional intake should have an enteral feeding tube inserted (assuming no contraindications) and feed commenced within 24-48 hours of admission as per the out of hours policy. Patients should then have a dietetic assessment within 48-72 hours. Nutritional requirements should be estimated on an individual basis taking into consideration various clinical parameters that may alter nutritional requirements, particularly in the acute phase. The commencement of any oral food or fluid intake should be in liaison with Speech and Language Therapy and their evaluation of the patient's swallow. Patients who have prolonged swallow deficits or an inability to manage sufficient oral intake should be considered for a gastrostomy tube insertion to facilitate long term feeding. This should be a multidisciplinary decision and a referral should be sent to the Nutrition Team for assessment and placement. Patients admitted with a chronic SCI should be screened using the Malnutrition Universal Screening Tool (MUST) and referred to a dietitian if required.	On admission Weight on admission ……
Section 12	**Pain management** See resource folder for more information	Common pain in SCI can be Neuropathic (due to dysfunction/damage of nervous system) and/or nociceptive (damage caused on non-neural tissue) Pain is a vital sign and should therefore be assessed regularly ***NB**: Neuropathic pain can be described as : burning, tingling, pricking, sharpness, shooting, squeezing, cold, electric or shock-like - Treatment options for neuropathic pain: tricyclic antidepressants (e.g. amitriptyline) antiepileptic drugs (gabapentin / pregabalin) - Opioids can be used for intractable pain, in combination with NSAID's	Continuous
Section 13	**Communication assessment** Refer all cervical SCI's to SLT, and other levels as required See resource folder for more information	Speech and Language Therapists provide assessment and treatment for swallowing, motor speech, voice and cognitive communication function in patients with SCI. Patients who sustain cervical spine injuries may experience dysphagia and voice disorders secondary to the effects of surgery or endotracheal intubation (especially if over 48 hours) and the presence of a collar. Artificial airways and mechanical ventilation may impact voice, swallow and ability to communicate effectively. Referral to SLT is routinely required for patients with cervical spine injuries, patients who have undergone anterior or posterior cervical spine surgery, those requiring mechanical ventilation and tracheostomy. Patients who are mechanically ventilated or have a tracheotomy with cuff inflated and are attempting to communicate and awaiting assessment by SLT, members of the MDT can trial use of low tech AAC (e.g. auditory alphabet charts, picture charts, yes/no flow chart). These are available in the "Communication" folder in the resource folders. Also consider environmental controls for your patient (refer to SLT/OT)	Continuous

Section 14	**Seating assessment & wheelchair provision** Consider in agreement with MDT Please see appendix 4 + resource folder for further guidance	**Initial considerations for seating** - Ensure clearance from medical team documented including medical stability, any precautions/restrictions e.g. collar - Ensure Initial use of abdominal binder for respiratory management and BP if T10 or above injury (see respiratory section) - abdominal binder can be weaned when cardiovascular system remains stable. - Considerations for the additional use of VTE equipment during hoist e.g. TED stockings, intermittent pneumatic compression/flowtron therapy as available - Appropriate specialist wheelchair and cushion (patient dependent) - Ensure rescue medication for cardiovascular insufficiency prescribed and readily available e.g. Ephedrine, Midodrine, glycopyrrolate appropriate (patient dependent). **Seating assessment** - Graded sitting up in bed 0-60 degrees with gradual lowering of legs for 3-4 hours - Monitor BP and pressure areas - Complete hoist transfer always for first seating assessment - **Strict graded seating plan** from day 1 (increase time in chair by 30-60 minutes every day if pressure areas remain intact) **Pressure Considerations** **Do not seat patients with any grade pressure sore or moisture lesion where pressure will be directly applied to that area.** -Refer to: - Pressure care section above for more guidance - Ward therapy team - Spinal CNS - Tissue viability nurse	Initial seating assessment date to chair: …… Specify which specialist and date: ……. …… ……
Section 15	**Goal Setting / Rehabilitation Programme & Outcome Measures** To be established by therapy team once suitable See resource folder for more information	An early rehabilitation programme for spinal cord injury has been created to provide guidance on the rehabilitation potential for cord injuries with clearer trajectories e.g. complete injuries. This is available as a key resource document. **Before commencement:** - Ensure clearance from medical team documented including medical stability, any precautions or restrictions e.g. collar. - All patients with SCI should be individually assessed for the potential benefits of standing. - Consider additional CVS exercise to improve aerobic capacity/endurance guided by medical team if any instability present. **Specific Speech and Language rehabilitation** - Individual assessment to establish appropriate and effective means of communicating, ideally by restoring natural communication via own speech or use of AAC for patients unable to communicate verbally. - Assessment of cognitive communication (for patients with co-occuring brain injury) and voice function - Consider prompt swallow assessment to establish early oral intake with consideration for objective swallow assessments (FEES/VFS) as required **All MDT** A range of outcome measures can be completed on admission, every fortnight and on discharge: **- ASIA (see initial neurological assessment section)** **- SCIM** (quick to do, specific to SCI Ax performance of ADLs) **- FIM** (gold standard for ax of basic ADLs. Motor & socio-cognitive subscales) **- Neutral-0 and Ashworth Scale** - **Goal Attainment Scale (GAS)** can be used to set measurable goals **Speech and Language specific** **- AusTOMs** – Trache, voice, cognitive/communication **- RBHOMS** - Dysphagia	Continuous

Section 16	**Psychological, emotional and peer support** Refer once appropriate See resource folder for more information	SIA website for patient/relatives/carers (emotional and practical signposting) Peer support offered Expert patient visit – liaise with SIA Discuss mood/motivation /engagement monitoring (in sessions and in MDT Long Term Ward Round), anti-depressants and referral to RAID or ACCU psychology as required	Specify and date referral to specialist: …….. ……..
Section 17	**Overall planning** (Including rehabilitation, discharge and current admission) All MDT involvement See resource folder for more information	- Any issues / new concerns to be addressed with MDT as appropriate - Timely consideration of: Discharge destination (local SCI center, neuro-rehabilitation unit, nursing home etc.) Specialist equipment Family meeting Involvement of other MDT members	Specify date of referrals / meetings …… ……

Appendices

1 – Autonomic Dysreflexia guide
2 – Respiratory Management in SCI
3 – ASIA
4 – Pressure Care
5 – Bowel Management algorithm
6 - Table log for variations from care plan

For additional information on specific sections, please refer to the key resource pack:

- Box app
- Resource folder on (I:) drive

Location 1:

- \\LNASV3\Directorates$\surgery_&_anaes\SpinalCord Injuries

Location 2:

- \\LNASV3\Directorates$\surgery_&_anaes\ACCU\SpinalCord Injuries

Location 3:

- \\LNASV3\Directorates$\nursing_&_therapies\THERAPIES\SpinalCord Injuries

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NRH National Rehabilitation Hospital

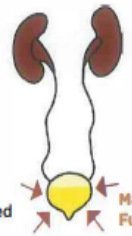
THE MYSTERY OF AUTONOMIC DYSREFLEXIA?

Autonomic Dysreflexia (AD) is a medical emergency specific to individuals with Spinal Cord Injury (SCI) at the neurological level of T6 or above. It is usually caused when a painful irritation occurs below the level of your spinal cord injury. It can present with a variety of signs / symptoms which can vary from mild to severe discomfort. As a SCI individual you need to have a good understanding of AD and be familiar with signs and symptoms and immediate management of this potentially life threatening condition. It must be addressed immediately because if it is untreated it may progress to cause a seizure, stroke or death. (Ahrens Prestice 1998).

CAUSES

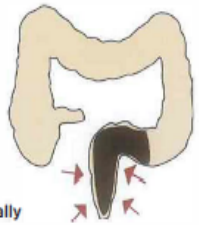
Bladder
- Distension (due to catheter blockage or kinking)
- Urinary tract infection
- Bladder stones

Bowel
- Constipation
- Haemorrhoids
- Fissure
- Having bowel care performed



Skin
- Pressure Ulcer
- Tight Clothing
- Ingrown toenail
- Blister/burn

Others
- Scrotal compression
- Sexual stimulation
- Labour childbirth
- Menstruation and any condition that would usually cause abdominal pain



Emergency Treatment for Autonomic Dysreflexia

Signs / Symptoms of Autonomic Dysreflexia

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Call for assistance - Sit upright and lower legs - Loosen any tight clothing / legs straps - Monitor BP until symptoms have resolved

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Common causes to exclude / treat first are:

1. Bladder Distension - 2. Constipation

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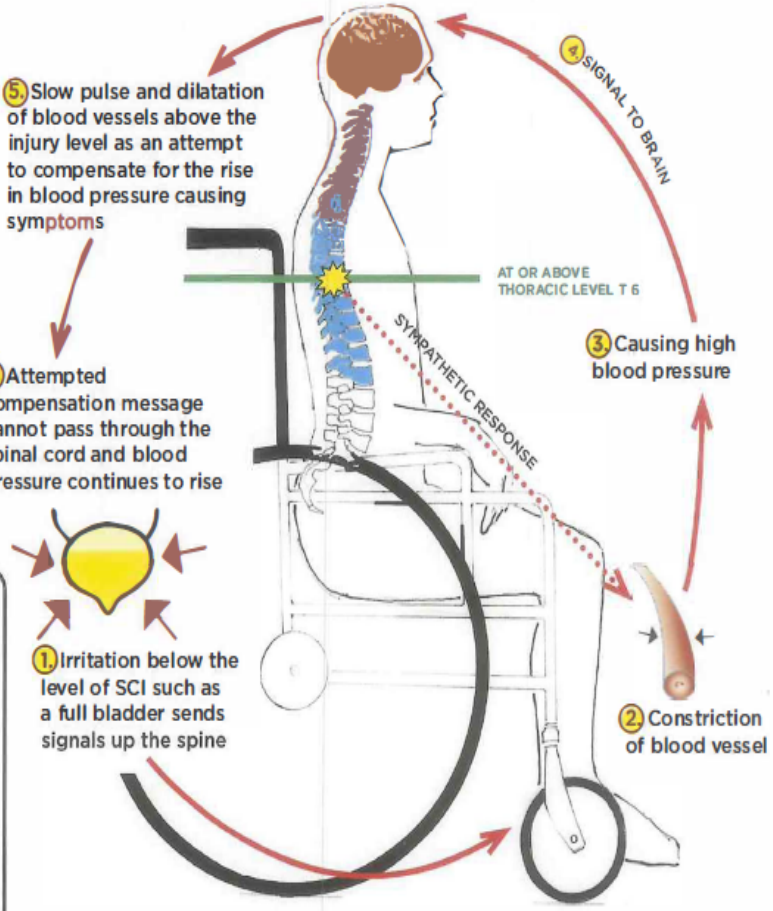
If symptoms persist and cause is unknown - Take prescribed medication - Nifedipine 10mg capsule "bite and swallow" method

↓

If BP not settling and cause not identified

Contact your GP or Accident / Emergency Department

HOW DO I GET AUTONOMIC DYSREFLEXIA?



5. Slow pulse and dilatation of blood vessels above the injury level as an attempt to compensate for the rise in blood pressure causing symptoms

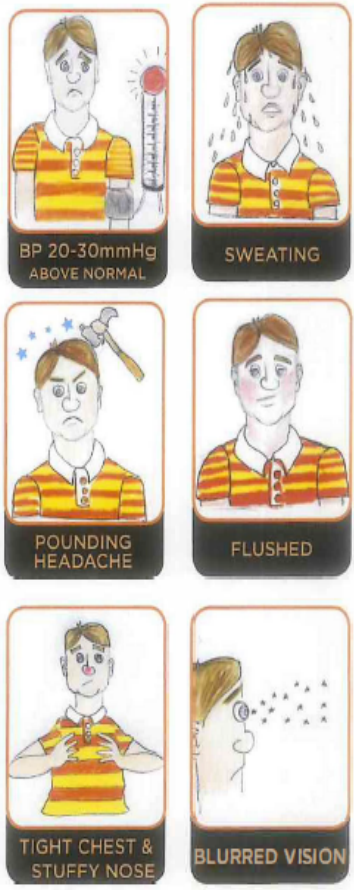
6. Attempted compensation message cannot pass through the spinal cord and blood pressure continues to rise

1. Irritation below the level of SCI such as a full bladder sends signals up the spine

2. Constriction of blood vessel

3. Causing high blood pressure

SIGNS & SYMPTOMS

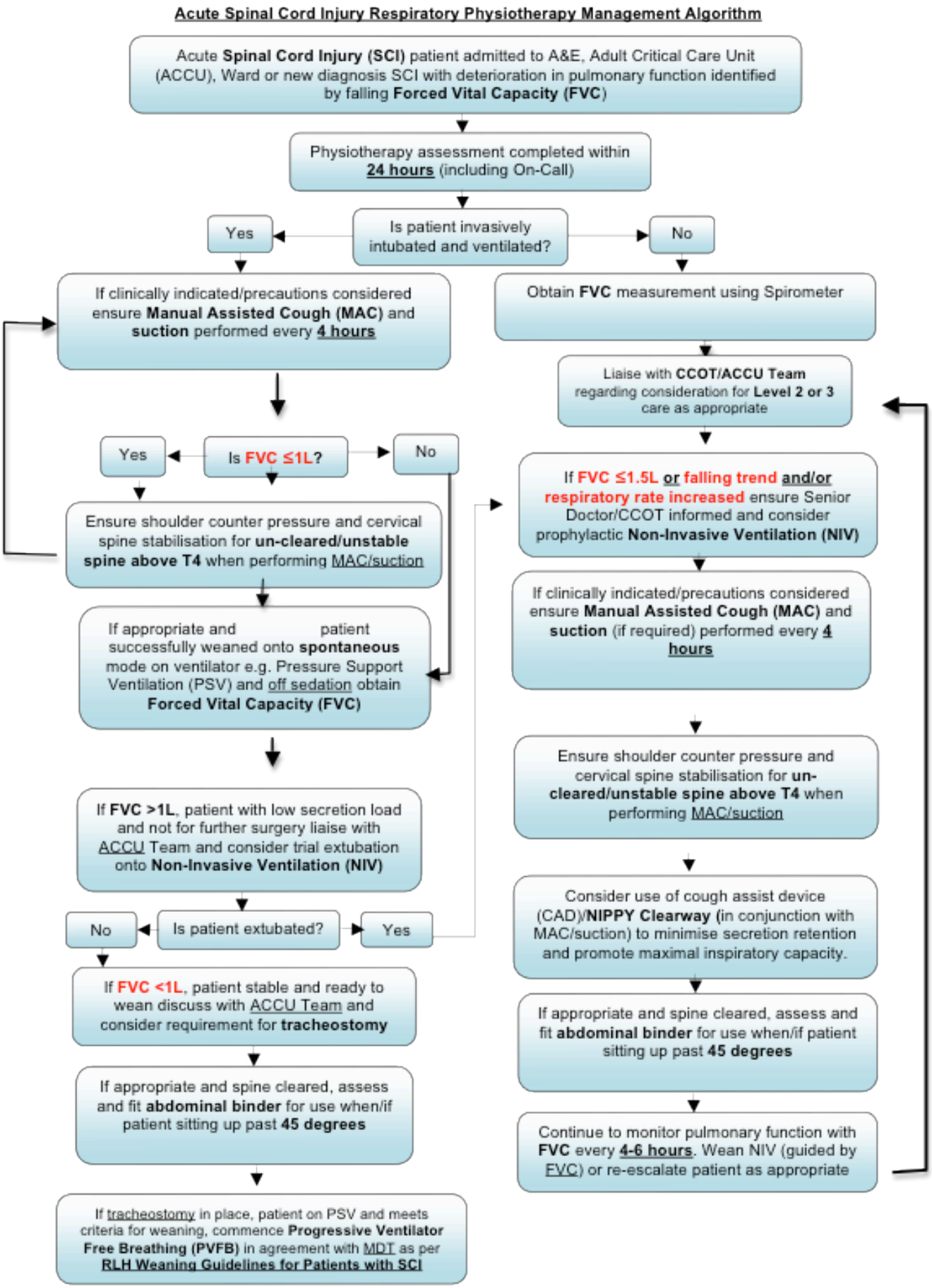


CONCLUSION

It is essential for you, family members or carers to recognise and understand the potential causes, prevention and treatment of AD. If an episode of AD is identified quickly, and treated immediately the symptoms may then subside, thus removing the likelihood of complications.

Eva Wallace Sinthya Lewis Siobhan Carrigg Liz Croxon Eimear Smith

Appendix 2: Respiratory Management in SCI



Abdominal Binders

Abdominal binders are used to optimise respiratory function by supporting the abdomen and improving the position of the diaphragm.

The binder should cover the widest part of the abdomen and sit below the ribs. It should be worn if the patient is sitting up over 45 degrees and not at night.

Coughing

Suction will stimulate a cough reflex but in SCI the cough strength is compromised and may not be sufficient to clear secretions

Assisted coughing should be considered in SCI level above T11 there are precautions e.g. abdominal trauma and paralytic ileus and this can be discussed with the Physiotherapist.

Injury level	Cough
C1 - C2	absent
C3 – C7	ineffective
T1 -T4	weak
T4 – T11	improving
below T11	strong

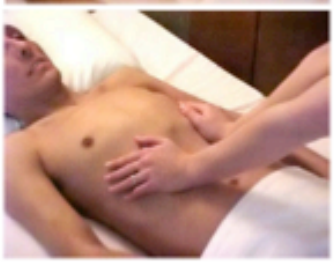
Nebulisers

The Spinal units recommend the use of regular bronchodilators whether or not the patient is wheezy secondary to bronchial hypersecretion and hyper responsiveness post SCI.

Consider the need for this and MucoClear® (hypertonic saline solution 6%) in your daily assessment.

Assisted cough

This technique is a 2 person manoeuvre. One to apply the force, and the other to suction or combine with cough assist device



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INTERNATIONAL STANDARDS FOR NEUROLOGICAL CLASSIFICATION OF SPINAL CORD INJURY (ISNCSCI)

ASIA — American Spinal Injury Association
ISCOS — International Society of Clinical Spinal Cord Medicine

Patient Name _____ Date/Time of Exam _____

Examiner Name _____ Signature _____

RIGHT

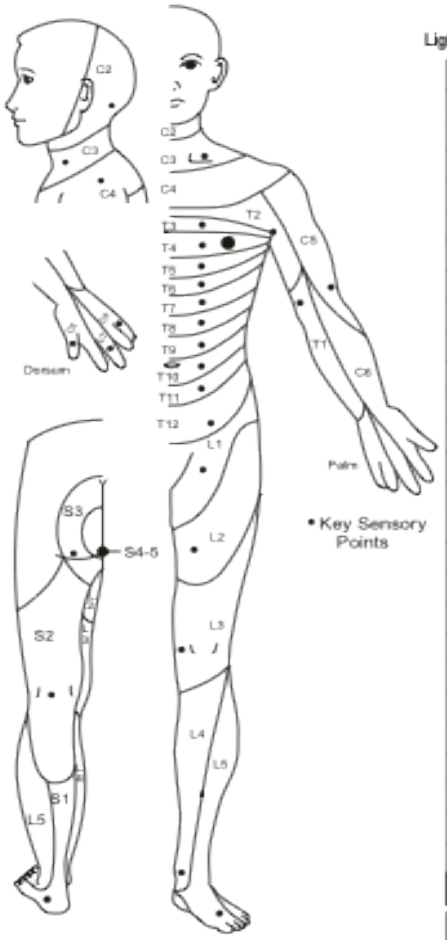
		MOTOR KEY MUSCLES	SENSORY KEY SENSORY POINTS Light Touch (LTR)	Pin Prick (PPR)
	C2			
	C3			
	C4			
Elbow flexors	C5			
Wrist extensors	C6			
Elbow extensors	C7			
Finger flexors	C8			
Finger abductors (little finger)	T1			
	T2			
	T3			
	T4			
	T5			
	T6			
	T7			
	T8			
	T9			
	T10			
	T11			
	T12			
	L1			
Hip flexors	L2			
Knee extensors	L3			
Ankle dorsiflexors	L4			
Long toe extensors	L5			
Ankle plantar flexors	S1			
	S2			
	S3			
	S4-5			
RIGHT TOTALS (MAXIMUM)		(50)	(56)	(56)

UER (Upper Extremity Right)

LER (Lower Extremity Right)

Comments (Non-key Muscle? Reason for NT? Pain? Non-SCI condition?):

(VAC) Voluntary Anal Contraction (Yes/No) ☐



LEFT

		SENSORY KEY SENSORY POINTS Light Touch (LTL)	Pin Prick (PPL)	MOTOR KEY MUSCLES
	C2			
	C3			
	C4			
C5	Elbow flexors			
C6	Wrist extensors			
C7	Elbow extensors			
C8	Finger flexors			
T1	Finger abductors (little finger)			
	T2			
	T3			
	T4			
	T5			
	T6			
	T7			
	T8			
	T9			
	T10			
	T11			
	T12			
	L1			
L2	Hip flexors			
L3	Knee extensors			
L4	Ankle dorsiflexors			
L5	Long toe extensors			
S1	Ankle plantar flexors			
	S2			
	S3			
	S4-5			
LEFT TOTALS (MAXIMUM)		(56)	(56)	(50)

UEL (Upper Extremity Left)

LEL (Lower Extremity Left)

MOTOR (SCORING ON REVERSE SIDE)

0 = Total paralysis
1 = Palpable or visible contraction
2 = Active movement, gravity eliminated
3 = Active movement, against gravity
4 = Active movement, against some resistance
5 = Active movement, against full resistance
NT = Not testable
0*, 1*, 2*, 3*, 4*, NT* = Non-SCI condition present

SENSORY (SCORING ON REVERSE SIDE)

0 = Absent
1 = Altered
2 = Normal
NT = Not testable
0*, 1*, NT* = Non-SCI condition present

(DAP) Deep Anal Pressure (Yes/No) ☐

MOTOR SUBSCORES

UER ☐ + UEL ☐ = UEMS TOTAL ☐ (MAX (25) (25) (50))

LER ☐ + LEL ☐ = LEMS TOTAL ☐ (MAX (25) (25) (50))

SENSORY SUBSCORES

LTR ☐ + LTL ☐ = LT TOTAL ☐ (MAX (56) (56) (112))

PPR ☐ + PPL ☐ = PP TOTAL ☐ (MAX (56) (56) (112))

NEUROLOGICAL LEVELS (Steps 1- 6 for classification as on reverse)		R	L
	1. SENSORY		
	2. MOTOR		
3. NEUROLOGICAL LEVEL OF INJURY (NLI)			
4. COMPLETE OR INCOMPLETE? (Incomplete = Any sensory or motor function in S4-5)		☐	
5. ASIA IMPAIRMENT SCALE (AIS)			
6. ZONE OF PARTIAL PRESERVATION (Most caudal levels with any innervation) (In injuries with absent motor OR sensory function in S4-5 only)	SENSORY		
	MOTOR		

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NHS Barts Health NHS Trust

WeCare
Our vision, values and behaviours
EQUITABLE
RESPECTFUL
ACCOUNTABLE
COLLABORATIVE
ENGAGING
WELCOMING

Muscle Function Grading

0 = Total paralysis

1 = Palpable or visible contraction

2 = Active movement, full range of motion (ROM) with gravity eliminated

3 = Active movement, full ROM against gravity

4 = Active movement, full ROM against gravity and moderate resistance in a muscle specific position

5 = (Normal) active movement, full ROM against gravity and full resistance in a functional muscle position expected from an otherwise unimpaired person

NT = Not testable (i.e. due to immobilization, severe pain such that the patient cannot be graded, amputation of limb, or contracture of > 50% of the normal ROM)

0*, 1*, 2*, 3*, 4*, NT* = Non-SCI condition present *

Sensory Grading

0 = Absent **1** = Altered, either decreased/impaired sensation or hypersensitivity

2 = Normal **NT** = Not testable

0*, 1*, NT* = Non-SCI condition present *

* Note: Abnormal motor and sensory scores should be tagged with a '*' to indicate an impairment due to a non-SCI condition. The non-SCI condition should be explained in the comments box together with information about how the score is rated for classification purposes (at least normal / not normal for classification).

When to Test Non-Key Muscles:

In a patient with an apparent AIS B classification, non-key muscle functions more than 3 levels below the motor level on each side should be tested to most accurately classify the injury (differentiate between AIS B and C).

Movement	Root level
Shoulder: Flexion, extension, adbuction, adduction, internal and external rotation **Elbow:** Supination	C5
Elbow: Pronation **Wrist:** Flexion	C6
Finger: Flexion at proximal joint, extension **Thumb:** Flexion, extension and abduction in plane of thumb	C7
Finger: Flexion at MCP joint **Thumb:** Opposition, adduction and abduction perpendicular to palm	C8
Finger: Abduction of the index finger	T1
Hip: Adduction	L2
Hip: External rotation	L3
Hip: Extension, abduction, internal rotation **Knee:** Flexion **Ankle:** Inversion and eversion **Toe:** MP and IP extension	L4
Hallux and Toe: DIP and PIP flexion and abduction	L5
Hallux: Adduction	S1

ASIA Impairment Scale (AIS)

A = Complete. No sensory or motor function is preserved in the sacral segments S4-5.

B = Sensory Incomplete. Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-5 (light touch or pin prick at S4-5 or deep anal pressure) AND no motor function is preserved more than three levels below the motor level on either side of the body.

C = Motor Incomplete. Motor function is preserved at the most caudal sacral segments for voluntary anal contraction (VAC) OR the patient meets the criteria for sensory incomplete status (sensory function preserved at the most caudal sacral segments S4-5 by LT, PP or DAP), and has some sparing of motor function more than three levels below the ipsilateral motor level on either side of the body. (This includes key or non-key muscle functions to determine motor incomplete status.) For AIS C – less than half of key muscle functions below the single NLI have a muscle grade ≥ 3.

D = Motor Incomplete. Motor incomplete status as defined above, with at least half (half or more) of key muscle functions below the single NLI having a muscle grade ≥ 3.

E = Normal. If sensation and motor function as tested with the ISNCSCI are graded as normal in all segments, and the patient had prior deficits, then the AIS grade is E. Someone without an initial SCI does not receive an AIS grade.

Using ND: To document the sensory, motor and NLI levels, the ASIA Impairment Scale grade, and/or the zone of partial preservation (ZPP) when they are unable to be determined based on the examination results.

ASIA
AMERICAN SPINAL INJURY ASSOCIATION

INTERNATIONAL STANDARDS FOR NEUROLOGICAL CLASSIFICATION OF SPINAL CORD INJURY

ISCOS
INTERNATIONAL SPINAL CORD SOCIETY

Steps in Classification

The following order is recommended for determining the classification of individuals with SCI.

1. Determine sensory levels for right and left sides.
The sensory level is the most caudal, intact dermatome for both pin prick and light touch sensation.

2. Determine motor levels for right and left sides.
Defined by the lowest key muscle function that has a grade of at least 3 (on supine testing), providing the key muscle functions represented by segments above that level are judged to be intact (graded as a 5).
Note: in regions where there is no myotome to test, the motor level is presumed to be the same as the sensory level, if testable motor function above that level is also normal.

3. Determine the neurological level of injury (NLI).
This refers to the most caudal segment of the cord with intact sensation and antigravity (3 or more) muscle function strength, provided that there is normal (intact) sensory and motor function rostrally respectively).
The NLI is the most cephalad of the sensory and motor levels determined in steps 1 and 2.

4. Determine whether the injury is Complete or Incomplete.
(i.e. absence or presence of sacral sparing)
*If voluntary anal contraction = **No** AND all S4-5 sensory scores = **0** AND deep anal pressure = **No**, then injury is **Complete.***
*Otherwise, injury is **Incomplete**.*

5. Determine ASIA Impairment Scale (AIS) Grade.

Is injury Complete? If YES, AIS=A

NO ↓

Is injury Motor Complete? If YES, AIS=B

NO ↓ (No=voluntary anal contraction OR motor function more than three levels below the motor level on a given side, if the patient has sensory incomplete classification)

Are at least half (half or more) of the key muscles below the neurological level of injury graded 3 or better?

NO ↓ **AIS=C**

YES ↓ **AIS=D**

If sensation and motor function is normal in all segments, AIS=E
Note: AIS E is used in follow-up testing when an individual with a documented SCI has recovered normal function. If at initial testing no deficits are found, the individual is neurologically intact and the ASIA Impairment Scale does not apply.

6. Determine the zone of partial preservation (ZPP).
The ZPP is used only in injuries with absent motor (no VAC) OR sensory function (no DAP, no LT and no PP sensation) in the lowest sacral segments S4-5, and refers to those dermatomes and myotomes caudal to the sensory and motor levels that remain partially innervated. With sacral sparing of sensory function, the sensory ZPP is not applicable and therefore "NA" is recorded in the block of the worksheet. Accordingly, if VAC is present, the motor ZPP is not applicable and is noted as "NA".

Appendix 4 – Pressure Care

ACUTE SPINAL INJURY PATIENT POSITIONING

Fig 3: Sitting Up

Fig 4: Sitting Up, Feet and Hands Supported.

ACUTE SPINAL INJURY PATIENT POSTIONING

Fig 10: Side Lying

ACUTE SPINAL INJURY PATIENT POSITIONING

Fig 5: Supine, "International No Positioning"

Fig 6: Supine, "Reverse International No Position"

Initial Mobilisation Timings

Recommend gradual increase in sitting time as below:

- Day 1 = 30 minutes maximum
- Day 2 = 1 hour, commence pressure relief
- Day 3 = 2 hours (if staffing permits twice a day)
- Day 4 = 3 hours (if staffing permits twice a day)
- Day 5 = 4 hours (official start of rehabilitation)
- Day 6 = 5 hours
- Day 7 = 6 hours
- Day 8 = 7 hours
- Day 9 = 8 hours

Consider

- Progress will be dependent on levels of fatigue
- Review skin following sitting/mobilisation
- Check for blanching if any marks
- Skin marks must fade within 30 minutes
- Position patient on their side upon return to bed to rest pressure areas

Specialist Tilt in Space (TIS) wheelchair

Standard wheelchair

Royal National Orthopaedic Hospital NHS
NHS Trust

The following information is a guide only and is not prescriptive. Therapeutic intervention should be considered on an individual basis.

SITTING PRESSURE RELIEF TECHNIQUE

Prolonged sitting pushes the blood (and subsequently the oxygen in the blood) out from under bony prominences. Without oxygen tissue cells will die and the skin starts to breakdown, this process happens within an hour.

To prevent skin breakdown it is recommended that two consecutive minutes of pressure relief be carried out every hour of sitting.

Forward Lean Technique can be carried out independently or with assistance.

1. Apply the brakes on the wheelchair
2. Lean forward/be brought into a forward lean position. This changes the orientation of your pelvis so that sitting bones are no longer in contact with the cushion.
3. For an effective pressure relief, place your hands under the Ischial Tuberosities (IT's) to ensure they are clear from the cushion.
4. Hold position for 2 minutes then push up/be brought back up into upright sitting
5. Always explain the process to the individual. During the initial stages of rehabilitation, leaning forwards can often be a frightening experience.

Independent forward lean pressure relief

A  B  C 

- Leaning forwards onto the elbows is likely to be sufficient for a pressure relief (Picture B).
- In some cases individuals may need to lean further forwards (Picture C).

Assisted forward lean pressure relief

- Ensure the upper limbs are positioned for protection.
- If head control is limited, may require support.

Assisted tilting back of wheelchair greater than 65 degrees technique

- When tilt in the wheelchair is not sufficient to achieve pressure relief (65 degrees), assistance will be needed to manually tilt the wheelchair
- Apply the brakes.
- Ensure the carer has a chair available to sit on during the process.
- The patients head may need to rest on the carers shoulder if there is no headrest, or a pillow can be used to assist with this.

Assisted side to side pressure relief

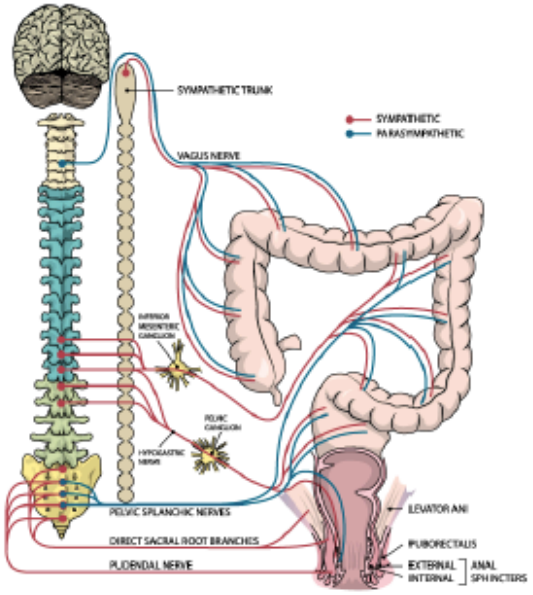
- In some instances where the forwards lean technique is not appropriate, side lean relief is an alternative.
- The leg opposite to the leaning side needs to be crossed to ensure IT clearance.
- Ensure the upper limbs are positioned for protection.

Appendix 5 - Neurogenic Bowel Management

Bowel function

'After a spinal cord injury the descending input from the brain to the colon and ano-rectum is lost.

These changes result in the loss of sensation of the need for defaecation, loss of voluntary control of defaecation and loss of the brain's influence over reflex activity.
The enteric nervous system, which lies within the walls of the colon, remains functionally intact. Therefore peristalsis continues, but without the co-ordination from the brain and spinal cord it is less effective, and colonic transit time can be extended to around 80 hours on average. This is an increase of approximately 50 hours above the average for the able bodied population and this extended time in the colon results in a drier stool and an increased likelihood of constipation.
Other effects on the bowel depend on the part of the spinal cord that is damaged.
When spinal shock has resolved, one of two types of neurogenic bowel may develop – reflexic or areflexic.' -
MJC/AM updated May 2007 – Stoke Mandeville Guidelines



	Sympathetic innervation	Parasympathetic innervation
Small intestine	Celiac and superior mesenteric ganglion – reduce mobility and secretion	Cranial nerve X (vagus) – increase mobility and secretion
Colon	Superior and inferior mesenteric ganglion – reduce mobility and secretion	Cranial nerve X and Sacral 2,3,4 – increase mobility and secretion
Rectum	Inferior mesenteric ganglion - constriction	Sacral 2,3,4 - relaxation

(Mestecky, 2011)

Evaluate bowel history
- ✓ Stool chart
- ✓ Frequency/duration
- ✓ GI Function
- ✓ Current bowel program
- ✓ Current symptoms
- ✓ Medications
- ✓ Fluid and dietary intake including daily fibre intake
- ✓ Prehistory pattern of elimination

Perform physical exam
- ✓ Abdominal
- ✓ Anorectal (including **sensation, tone, anal contraction & reflexes**) – to be completed by medical team / Spinal CNS
- ✓ Stool testing (if indicated)

Complex Spine Clinical Nurse Specialist JT /2019

Assess knowledge, cognition, function and performance

- ✓ Completing, directing and effectiveness of bowel care

Design bowel management program

- ✓ Based on history, exam and assessment of knowledge, cognitive function, performance and community setting
- ✓ Establish consistent prescribed schedule
- ✓ Encourage diet, fluids and activity to achieve desired stool consistency and evaluate and select assistive techniques
- ✓ Establish structured and comprehensive bowel management education program

Avoid frequent changes of regimen

- ✓ Give each interaction time to work before changing following assessment, agree duration of trial (usually 10-14 days)

Evaluate effectiveness of bowel care program

After adherence to program for 10-14 days

Effective if:

- ✓ Time taken <30 mins
- ✓ Stool form (Reflexic - Bristol stool type 4, Areflexic - Bristol stool type 3)
- ✓ Daily or alternate days
- ✓ No incontinence
- ✓ No abdominal pain
- ✓ No straining
- ✓ Management fits to lifestyle
- ✓ No autonomic dysreflexia
- ✓ Regular and predictable, socially acceptable time and place.

Reflexic Bowel Management*

Reflexic bowel - Positive anal reflex. Bulbo-anal reflex. Injury/damage to spinal cord at or above 12th thoracic vertebra. Reflex or spastic paralysis

- ✓ Daily or alternate day, at a regular time
- ✓ Attention to diet
- ✓ Regular oral medication for stool consistency (if required)
- ✓ Bristol stool scale type 4
- ✓ Stimulant Laxative 8-12hours before planned bowel care (if required)
- ✓ Hot drink and/or food 20-30mins before bowel care (Gastrocolic reflex)

Step 1 **Gastrocolic reflex**

Step 2 **Insert rectal stimulant** - Suppository/microenema

Step 3 **Abdominal massage**

Step 4 **Digital rectal stimulation (DRS)**

Step 5 **Digital removal of faeces (DRF) if required**

Step 6 **Digital rectal examination to check complete evacuation**

Step 7 **Rectum empty**

No - return to step 3

Yes - repeat check after 5 minutes to ensure evacuation is complete

Flaccid bowel management*

Areflexic* No anal reflex. Absent bulbo-anal reflex. Injury/damage to conus or cauda equine, at or below 1st lumbar vertebra. Flaccid paralysis

- ✓ Daily or twice daily at a regular time
- ✓ Attention to diet
- ✓ Regular oral medication for stool consistency (if required)
- ✓ Bristol stool scale type 2-3
- ✓ Hot drink and/or food 20-30mins before bowel care

Step 1 **Gastrocolic reflex**

Step 2 **Abdominal massage**

Step 3 **Digital removal of faeces (DRF)**

Step 4 **Digital rectal exam to check if evacuation is complete**

Step 5 **Rectum empty?**

No - Return to step 2

Yes - Repeat check in 5 minutes to ensure evacuation is complete

*As per MASCIP guidelines 2016

Appendix 6 – Table log for Variations from care plan

(please ensure that variations from the actions on the care plan are escalated to the relevant member of the team)

Variation/action/date	Reason	Action taken	Signature