Peninsula Trauma Network

SPINAL CORD INJURY PATHWAY ALGORITHM

Inclusion Criteria

Clinical diagnosis of spinal cord injury resulting in full or partial, para or tetraplegia as a result of any traumatic or non-progressive non-traumatic insult

Admission to hospital

Traumatic | **Non Traumatic**

Assessment & Clinical Diagnosis of spinal cord injury

ASIA, imaging and key clinical findings

Exclusion Criteria

Injury to the vertebral column without cord injury.

Useful MTC Contact Numbers

- Switchboard – 0845 155 8155
- Neurosurgical Registrar- 1009
- Pencarrow ICU Trainee – 0110
- Acute Care Team - 89048
- MTC Coordinator- 1050/1054
- Moorgate Ward ext 31952
- Pencarrow Ward ext 31462
- Neurosurgical physiotherapist bleep 0884/85203
- Consultant Therapist - 0579
- Rehab Med Consultant - 89152

Emergency Department

Complete Red boxed section on page 3

Initiate Spinal Cord Injury Care Pathway

(This document)

Contact Salisbury SCI Centre

Tel: 01722 336262

Speak to: Duty Spinal Consultant

Traumatic call within 4 hours of clinical diagnosis
Non-Traumatic call within 24 hours of confirmed clinical diagnosis of spinal cord injury

Consultant/Registrar to SCIC Consultant telephone discussion.
Please have Medical notes, Observation and Medication Charts to hand.
Ensure assessments completed, including ABCDE assessment as per ATLS guidelines, organ support level, ASIA findings, injury summary and current management.
Appropriate location for optimum management agreed (including surgery).
Immediately agreed management plan for SCI documented in SCI pathway.
Document variance if telephone referral outside the above time limits.
Online registration of SCI Centre referral to be made (following call) this can be actioned by either Dr or AHP. nww.spinalreferrals.nhs.uk
Print off confirmation email and file in notes.

Follow SCIC MANAGEMENT PLAN and commence MULTI-PROFESSIONAL CARE PLAN (suggest use MTC SCI Care Plan)

Traumatic SCI Transfers

Transfer to SCIC or MTC as agreed with SCIC Consultant

Patient Review by a member of SCIC outreach team within 5 days (if appropriate)

Patient appropriate for SCI Centre admission
Referral prioritised & bed availability notified.
Weekly email updates to be sent to relevant MTC team members.
Staff to contact SCIC outreach team for all ongoing care management queries. .

Non- Traumatic SCI Transfers

Transfer to SCIC or local hospital as agreed with SCIC Consultant

Patient medically fit for transfer *(use transfer protocol)*

Transfer to SCIC – transport to be booked for 8am so that admission is by 1pm.

Aims of this pathway

1. Reduce delays in referral to SCIC
2. Prevent secondary spinal cord lesion
3. Minimise incidence of DVT and PE formation
4. Manage the cardiovascular impact of spinal shock appropriately
5. Prevent gastric ulceration
6. Prevent prolonged paralytic ileus and vomiting due to early commencement of enteral feeding
7. Prevent over-distension of the rectum with hard faeces and the prevention of constipation which can cause bowel perforation
8. Prevent pressure ulcer formation
9. Prevent bladder distension and accumulation of sediment and catheter blockage
10. Improve ventilation and perfusion
11. Maintain appropriate body temperature
12. Prevent foot drop and upper limb and finger contractures which might delay or prevent meaningful rehabilitation
13. Plan and undertake safe transfer to SCI Centre

SPINAL CORD INJURY CARE PATHWAY

(In collaboration with Duke of Cornwall Spinal Treatment Centre, Salisbury District Hospital)

Patient name: DOB: Hospital Number Address:	Consultant responsible for SCI care: *(Please complete the individual speciality clerking proforma for clinical details)*

Admission

Date of injury Time of Injury

Mechanism of Injury: Traumatic SCI Non-traumatic SCI

Derriford Emergency Department Date Time

RD&E Emergency Department Date Time

Transfer from Hospital Date Time

Injury summary: Spinal & other injuries	Stable # / Unstable#	Initial Management Plan	Date

Past Medical History	

ASIA SCORE within 4 hours of admission			Neurological level of injury	Complete/ Incomplete	ASIA Impairment	Zone of partial preservation	
	Right	Left				Right	Left
Sensory							
Motor							

THE ABOVE TO BE COMPLETED WITHIN 4 HOURS OF ADMISSION

ASIA SCORE at 24 hours from admission			Neurological level of injury	Complete/ Incomplete	ASIA Impairment	Zone of partial preservation	
	Right	Left				Right	Left
Sensory							
Motor							

ASIA SCORE at 72 hours from admission			Neurological level of injury	Complete/ Incomplete	ASIA Impairment	Zone of partial preservation	
	Right	Left				Right	Left
Sensory							
Motor							

ASIA SCORE after surgery *(if applicable)*			Neurological level of injury	Complete/ Incomplete	ASIA Impairment	Zone of partial preservation	
	Right	Left				Right	Left
Sensory							
Motor							

REFER TO SPINAL CORD INJURY CENTRE (SCIC)
WITHIN 4 HOURS OF ADMISSION

(both a & b options are mandatory for referral to the Spinal Injuries Centre)

Duke of Cornwall Spinal Treatment Centre, Salisbury District Hospital, Salisbury (01722 336262)

Other

a) Verbal referral and management plan discussed with Consultant at SCIC

☐ Within 4 hrs of injury/ diagnosis with Cons (name)

Call made by Dr Grade Date Time

☐ Within 24 hrs of injury/ diagnosis with Cons (name)

Call made by Dr Grade Date Time

Reason for variation from above

Please ensure that the discussion with the SCIC Consultant is documented in the SCIC MANAGEMENT PLAN (Page 5)

b) Online referral made via nww.spinalreferrals.nhs.uk by Date Time
Signature

Accepted by SCI centre? YES NO Decision pending Outreach visit

Plan for future management if not for transfer to SCIC :

Date of SCIC Nurse Outreach Visit:

(See Page 7 for details of visit)

SCIC MANAGEMENT PLAN **Date:**

	Agreed management	Reason for deviation
Airway and ventilation	Self-ventilating IPPV BIPAP Target SPO_2 % Baseline FVC:	
Circulation	MAP target:	
VTE prophylaxis		
Skin	Temp:	
Position		
Gastric	NBM NG Free drainage Gastric ulcer prophylaxis	
Bladder		
Bowel	Reflexic bowel Areflexic bowel	
Autonomic dysreflexia	At risk of AD? Yes No http://www.spinalinjurycentre.org.uk/information/images/Dysreflexia_Alert_Card.pdf	
Other		
Patient and family awareness and understanding		

Summary of Medical/Surgical management plan/procedures

(To be completed contemporaneously)

a) Operative

Date	Procedure	Post-op plan (mobilisation, collar, LMWH, x-rays, time limits)

b) Non-operative

	Date	Plan
Collar		*(Complete collar care pathway – Appendix 1)*
Halo		*(Size of ring, size of jacket, pressure area care, review date)*
Traction		*(Type, weight, emergency contact)*
Other (e.g. orthotics)		

SCIC Nurse Outreach Visit

Date of visit:
Outreach nurse name: Contact number: Other health professionals present:
Outreach visit notes:

SCI prescription chart requirements

Regular Prescription	Rationale
Anticoagulants within 24 hrs unless contraindicated - LMWH, TEDS, Pneumatic compression device	Prevention of DVT/ PE
IV fluids	Manage cardiovascular impact of spinal shock Maintain a systolic BP of 90-100mmHg- or as per discussion with SCIC To maintain urine output 0.5 mls/kg/ hr
Bowel management	
Reflexic bowel - 2 Glycerin suppositories daily followed by digital stimulation/manual evacuation 15-30 mins prior to rectal examination and evacuation if the rectum is full. Empty rectum prior to insertion of suppositories. Wait 20-30 minutes then proceed to d.s/m.e until bowel is empty. Observe for signs of autonomic Dysreflexia in patients with T6 and above injuries. Treat as necessary.	Prevent over distension of the rectum with hard faeces and the development of constipation which can cause bowel perforation
Areflexic bowel - Daily PR check plus manual evacuation. Introduce aperients and stool softeners only as advised by SCIC or as per SW Neurosurgery Centre Acute Spinal Injury Bowel Care Guide	Prevent over distension of the rectum with hard faeces and the development of constipation which can cause bowel perforation. Do not use aperients until bowel sounds return, flatus occurs or bowels move consistently
Refer to 2004 NPSA statement on need for every NHS Trust to have a policy to support digital bowel evacuation in patients with neurogenic bowel dysfunction.	
PPI: (Omeprazole 20mg OD /Lansoprazole 30 mg OD. Ranitidine 150mg if PPI contraindicated) If previous gastric ulceration or bleeding history, higher level of protection may be needed and discussed with SCIC.	Prevent gastric ulceration. Increased risk of ulceration due to vagal over-activity and initial 'nil enterally' requirement.
With reference to ICS Ventilator bundle – in actual SCI patients, do not discontinue prophylactic pharmacological gastric protection upon commencement of enteral feeding. Risk and consequences of gastric bleeding is higher than translocation leading to VAP.	
As required Prescription	**Rationale**
Atropine 0.3-0.6mg may be given as IV bolus if the patient is cardio-vascularly unwell or unstable	Extreme bradycardia can result in cardiac syncope. Caution with oro-pharyngeal and tracheal suctioning with SCI lesion above T6.
Patients <60 years Nifedipine 10mg bitten Patients >60 years GTN spray sublingual (Discuss with SCIC Consultant prior to prescribing)	Acute treatment of Autonomic dysreflexia (a medical emergency with a hypertensive response to visceral pain or discomfort). Removal of trigger is definitive treatment.
Ephedrine 30-60mg (once /day) prior to trial of patient sitting out for the first time	To prevent postural drop on sitting upright. Usually in discussion with the therapy team. Caution regarding arrhythmias.

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

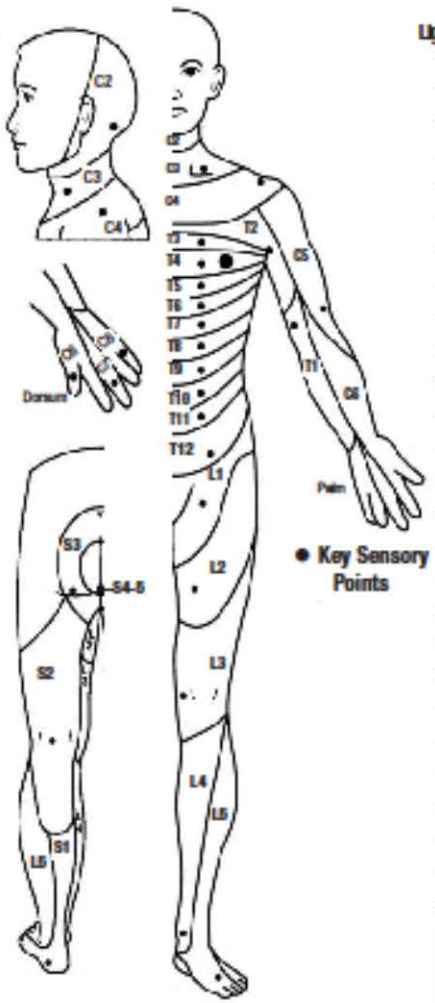
MOTOR KEY MUSCLES		SENSORY KEY SENSORY POINTS Light Touch (LTR)	Pin Prick (PPR)
	C2		
	C3		
	C4		
C5			
C6			
C7			
C8			
T1			
	T2		
	T3		
	T4		
	T5		
	T6		
	T7		
	T8		
	T9		
	T10		
	T11		
	T12		
	L1		
L2			
L3			
L4			
L5			
S1			
	S2		
	S3		
	S4-5		
RIGHT TOTALS (MAXIMUM)		(50)	(50)

UER (Upper Extremity Right)

LER (Lower Extremity Right)

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

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



● Key Sensory Points

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
(56)	(56)	(10) LEFT TOTALS (MAXIMUM)

LEFT

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
5 = normal corrected for pain/disuse*
NT = not testable

SENSORY *(SCORING ON REVERSE SIDE)*

0 = absent *2 = normal*
1 = altered *NT = not testable*

(DAP) Deep Anal Pressure (Yes/No) ☐

MOTOR SUBSCORES

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

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

SENSORY SUBSCORES

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

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

NEUROLOGICAL LEVELS
Steps 1-5 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) ☐

ZONE OF PARTIAL PRESERVATION
(to complete injuries only)
Most caudal level with any innervation

	R	L
SENSORY	☐	☐
MOTOR	☐	☐

REV 04/15

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

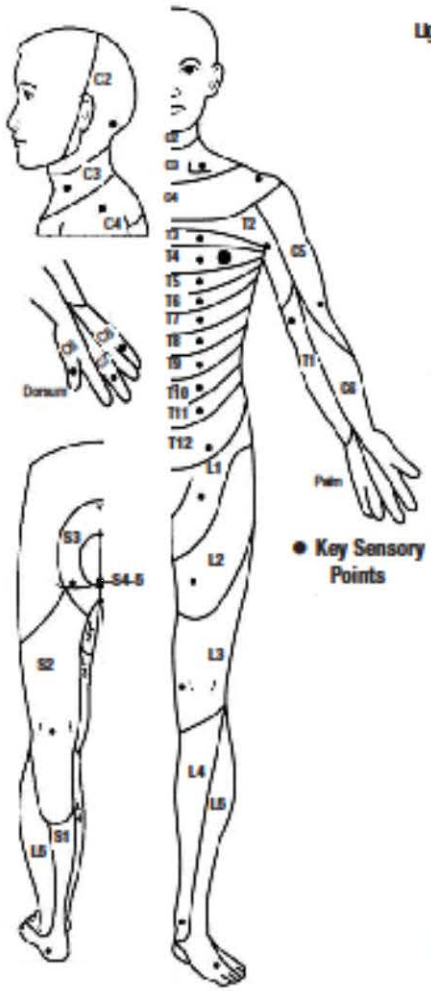
	MOTOR KEY MUSCLES	SENSORY KEY SENSORY POINTS Light Touch (LTR)	SENSORY KEY SENSORY POINTS Pin Prick (PPR)
C2			
C3			
C4			
C5			
C6			
C7			
C8			
T1			
T2			
T3			
T4			
T5			
T6			
T7			
T8			
T9			
T10			
T11			
T12			
L1			
L2			
L3			
L4			
L5			
S1			
S2			
S3			
S4-5			
RIGHT TOTALS (MAXIMUM)	(50)	(56)	(56)

UER (Upper Extremity Right)

LER (Lower Extremity Right)

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

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



● Key Sensory Points

LEFT

	SENSORY KEY SENSORY POINTS Light Touch (LTL)	SENSORY KEY SENSORY POINTS 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
5 = normal corrected for pain/disuse*
NT = not testable

SENSORY *(SCORING ON REVERSE SIDE)*

0 = absent *2 = normal*
1 = altered *NT = not testable*

(DAP) Deep Anal Pressure (Yes/No) ☐

MOTOR SUBSCORES

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

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

SENSORY SUBSCORES

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

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

NEUROLOGICAL LEVELS
Steps 1-5 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) ☐

ZONE OF PARTIAL PRESERVATION
(to complete injuries only)
Most caudal level with any innervation

	R	L
SENSORY	☐	☐
MOTOR	☐	☐

REV 04/15

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

ASIA — AMERICAN SPINAL INJURY ASSOCIATION

ISCOS — INTERNATIONAL SPINAL CORD SOCIETY

Patient Name _____ Date/Time of Exam _____

Examiner Name _____ Signature _____

RIGHT

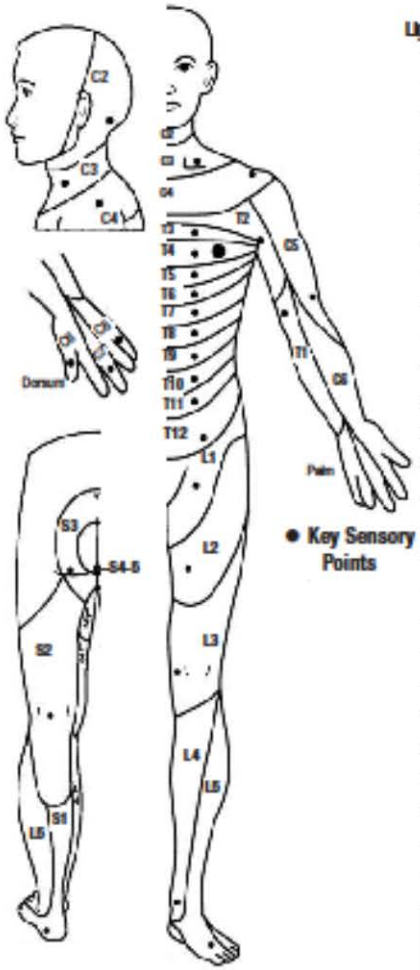
	MOTOR KEY MUSCLES	SENSORY KEY SENSORY POINTS Light Touch (LTR)	SENSORY KEY SENSORY POINTS Pin Prick (PPR)
C2			
C3			
C4			
C5			
C6			
C7			
C8			
T1			
T2			
T3			
T4			
T5			
T6			
T7			
T8			
T9			
T10			
T11			
T12			
L1			
L2			
L3			
L4			
L5			
S1			
S2			
S3			
S4-5			
RIGHT TOTALS (MAXIMUM)		(50)	(56)

UER (Upper Extremity Right)

LER (Lower Extremity Right)

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

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



● Key Sensory Points

	SENSORY KEY SENSORY POINTS Light Touch (LTL)	SENSORY KEY SENSORY POINTS Pin Prick (PPL)	MOTOR KEY MUSCLES
C2			
C3			
C4			
C5			
C6			
C7			
C8			
T1			
T2			
T3			
T4			
T5			
T6			
T7			
T8			
T9			
T10			
T11			
T12			
L1			
L2			
L3			
L4			
L5			
S1			
S2			
S3			
S4-5			
LEFT TOTALS (MAXIMUM)	(56)	(56)	(50)

LEFT

UEL (Upper Extremity Left)

- C5 *Elbow flexors*
- C6 *Wrist extensors*
- C7 *Elbow extensors*
- C8 *Finger flexors*
- T1 *Finger abductors (little finger)*

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
5 = normal corrected for pain/disuse*
NT = not testable

SENSORY *(SCORING ON REVERSE SIDE)*

0 = absent *2 = normal*
1 = altered *NT = not testable*

LEL (Lower Extremity Left)

- L2 *Hip flexors*
- L3 *Knee extensors*
- L4 *Ankle dorsiflexors*
- L5 *Long toe extensors*
- S1 *Ankle plantar flexors*

☐ *(DAP) Deep Anal Pressure (Yes/No)*

MOTOR SUBSCORES

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

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

SENSORY SUBSCORES

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

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

NEUROLOGICAL LEVELS *Steps 1-5 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) ☐

ZONE OF PARTIAL PRESERVATION *(In complete injuries only) Most caudal level with any innervation*

	R	L
SENSORY		
MOTOR		

REV 04/15

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

ASIA — AMERICAN SPINAL INJURY ASSOCIATION

ISCOS — INTERNATIONAL SPINAL CORD SOCIETY

Patient Name _____ Date/Time of Exam _____

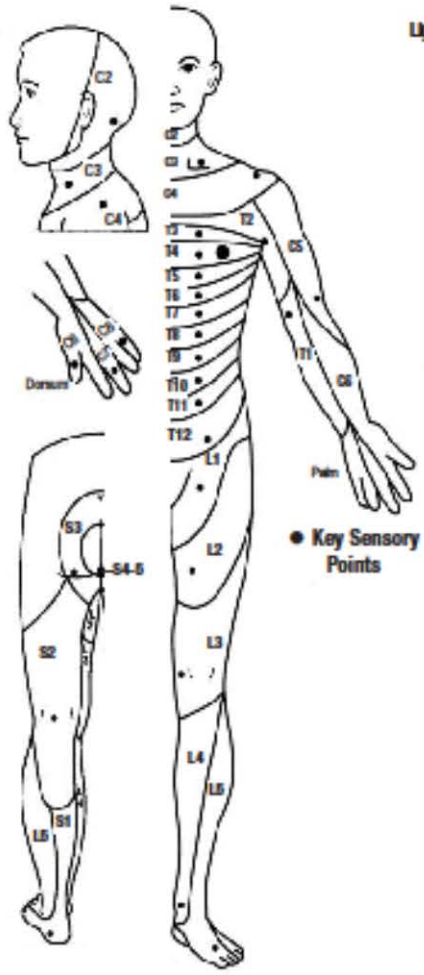
Examiner Name _____ Signature _____

RIGHT

	MOTOR KEY MUSCLES	SENSORY KEY SENSORY POINTS Light Touch (LTR)	SENSORY KEY SENSORY POINTS Pin Prick (PPR)
		C2	
		C3	
		C4	
UER (Upper Extremity Right)	C5		
	C6		
	C7		
	C8		
	T1		
		T2	
		T3	
		T4	
		T5	
		T6	
		T7	
		T8	
		T9	
		T10	
		T11	
		T12	
		L1	
LER (Lower Extremity Right)	L2		
	L3		
	L4		
	L5		
	S1		
		S2	
		S3	
		S4-5	
RIGHT TOTALS (MAXIMUM)		(50)	(56) (56)

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

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



● Key Sensory Points

	SENSORY KEY SENSORY POINTS Light Touch (LTL)	SENSORY KEY SENSORY POINTS 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)

LEFT

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
5* = normal corrected for pain/disuse
NT = not testable

SENSORY (SCORING ON REVERSE SIDE)

0 = absent 2 = normal
1 = altered NT = not testable

☐ *(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 1-5 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) ☐

(In complete injuries only)
ZONE OF PARTIAL PRESERVATION
Most caudal level with any innervation

	R	L
SENSORY	☐	☐
MOTOR	☐	☐

REV 04/15