EMMTN Conference Spinal Injury Workshop

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Acute SCI: Key Performance Indicators

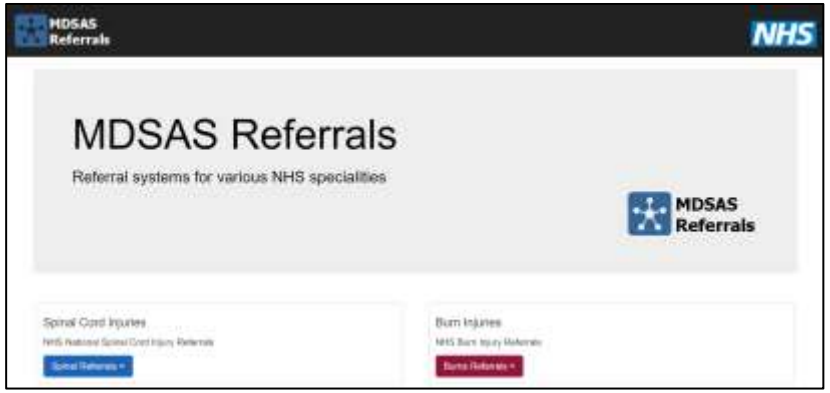
- Referrals
- Assessment
- ASIA Chart
- In-reach/Out-reach review
- MDT interaction
- Therapy Intervention
- Psychological Health
- Speech and Language
- Bladder and Bowel
- Tissue Viability

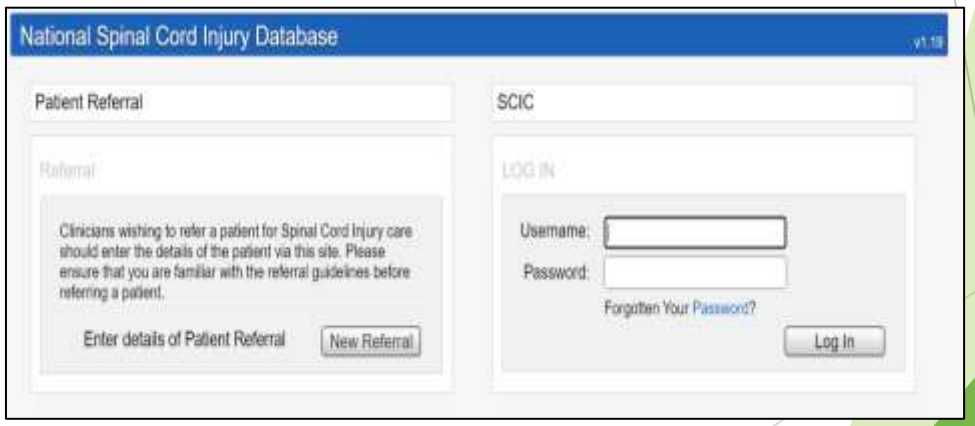
SCI Acute Pathway: Referrals

National Guidelines

1) All patients admitted to acute hospitals in England who are identified as having a spinal cord injury, traumatic or non- traumatic, must be referred to the link spinal cord injury centre within 24 hours using the electronic referral system.

MDSAS referral to Sheffield SCIC [MDSAS Referrals - Home Page]





Referral Standards for all Traumatic SCI Patients

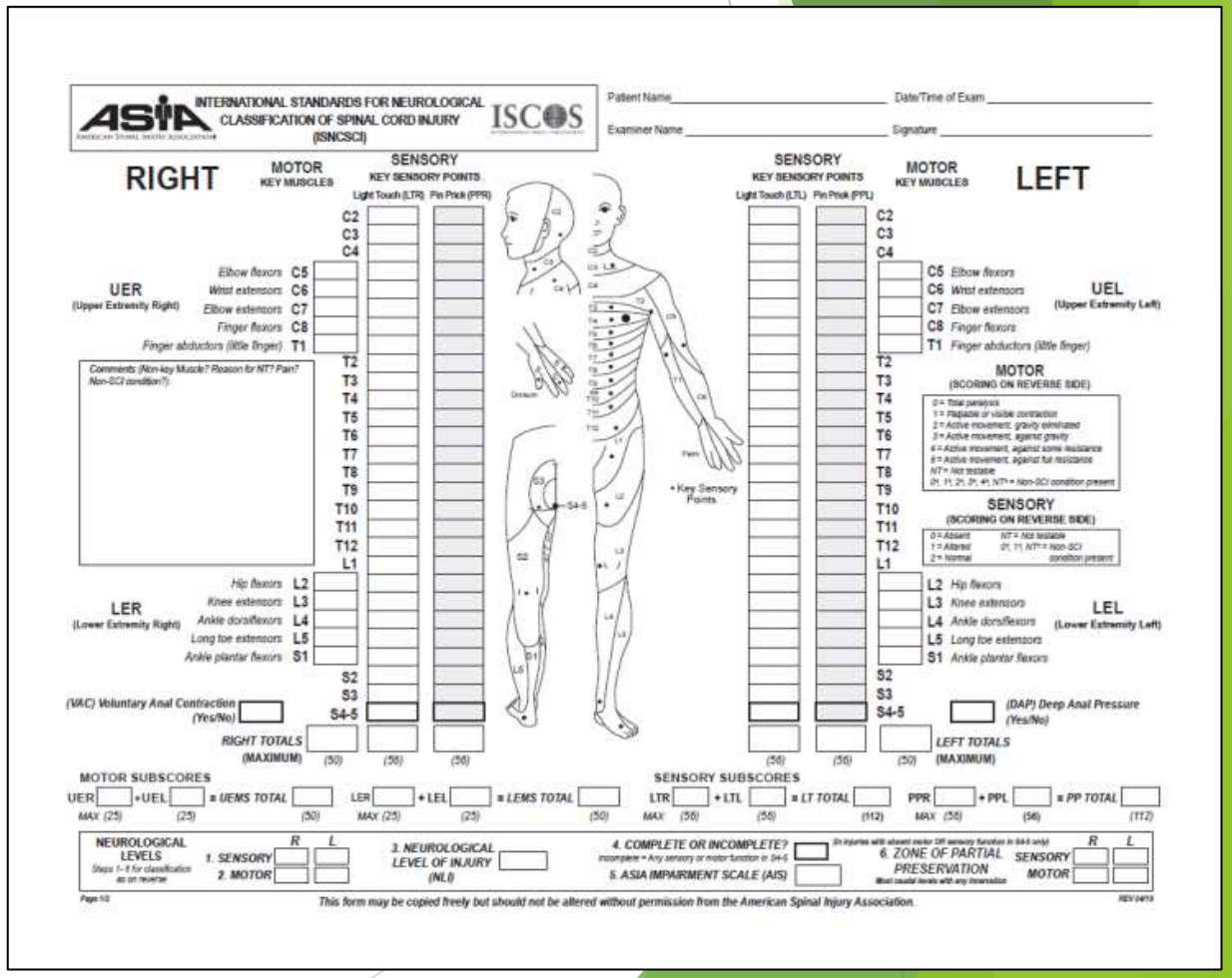
- The initial assessment and care of all traumatic spinal cord injury patients should follow the guidelines set out in NICE guidance NG41 and BOAST Guidelines:

- https://www.nice.org.uk/guidance/ng41/chapter/Recommendations#communication-with-tertiary-services

- https://www.boa.ac.uk/resources/knowledge-hub/boast-8-pdf.htm

ASIA Assessment

- All patients will have ISNCSCI (ASIA) chart completed within 6 hours of admission and weekly thereafter, while they continue in an acute setting.
- ISNCSCI assessment should be completed prior to and following any surgical intervention and/or change in circumstance



In- reach/Out-reach Review

- A joint review in-reach or out-reach) with a SCIC clinician and member of the referring team should take place within 72 hours of referral and a plan of care agreed.

- During the acute phase, regular review (every 48-72 hours) should be undertaken between the two services

Therapy Intervention

- All patients should be assessed by an OT and PT within 24 hours of admission to the spinal cord injury centre

Psychological Health

- Access to specialist psychological assessment (within 10 days of admission) and therapy during admission for all patients.

- Initial contact from psychosocial team member within 5 days

Speech and Language

- Access to Speech and Language Therapy for a minimum of five days a week for patients with communication and swallowing difficulties on admission is mandatory and should be part of the MDT assessment.

Bladder Management

- Commence Flip flow as soon as able with the view to TWOC as able/ commence ISC as appropriate as soon as possible (2/52 post-injury when there is a reasonable possibility of long term intermittent self-catheterisation)

Bowel Management

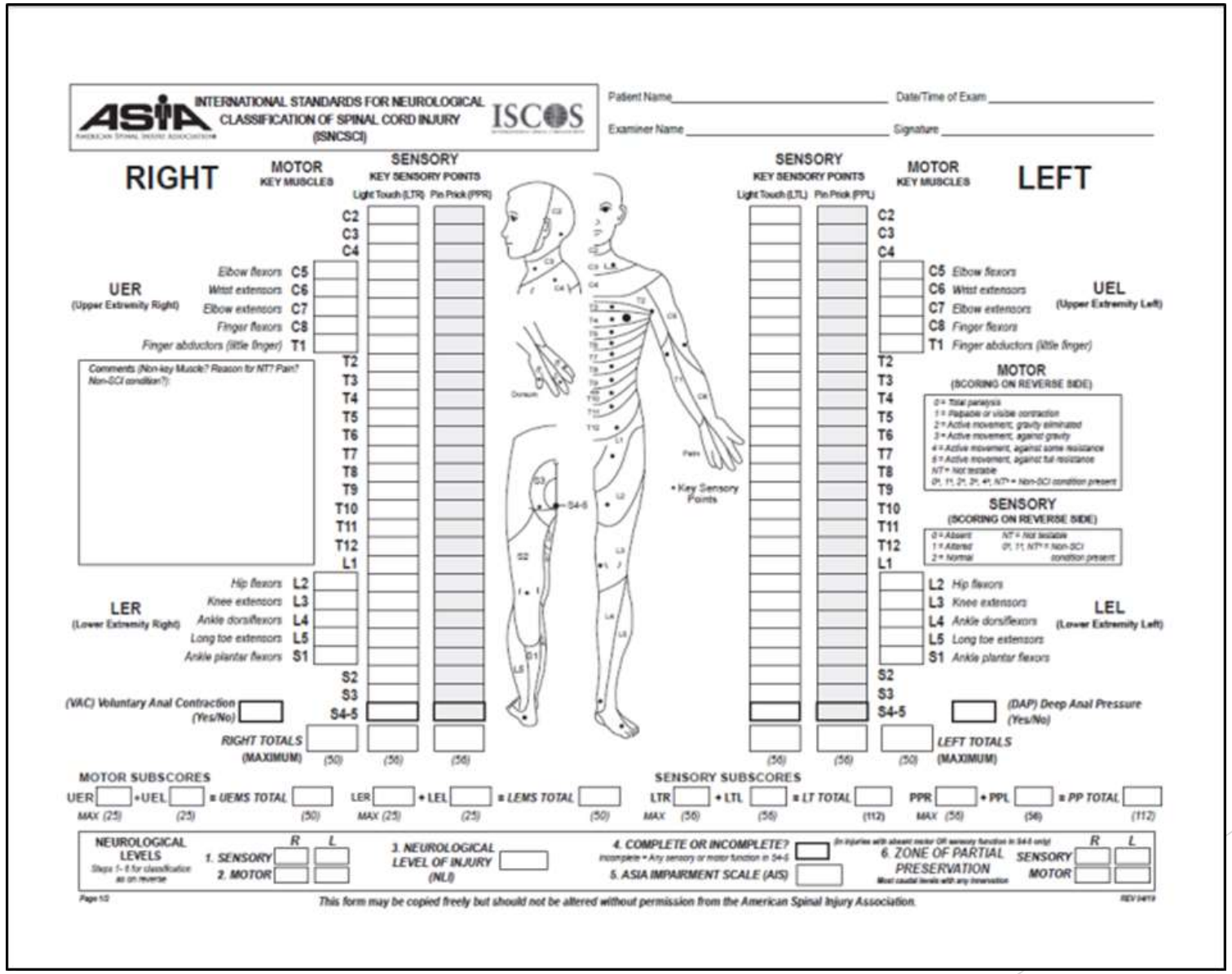
- Sacral segments assessed within 24 hours and repeated when indicated
- Assessment on day of admission to include pre-injury bowel function and management since SCI
- Ward based staff to plan and commence bowel management programme on day of admission
- Daily documentation of method and result (volume and consistency) of bowel management

Tissue Viability

Assessment, treatment, education and recommendations for optimal tissue viability management, to include:

1) Patient's skin visually assessed within 20 minutes of admission
2) Waterlow or equivalent skin integrity risk assessment completed and documented within 6 hours of admission and weekly thereafter
3) Nutritional screen within 24 hours of admission
4) Nutritional management plan established within 72 hours of admission
5) Documented tissue viability care plan with 6 hours of admission

Focus Point: ASIA Assessment



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

ISCOS

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)	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		
LER (Lower Extremity Right)	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)

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)	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	
	(56)	(56)	(50)	LEFT TOTALS (MAXIMUM)

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

(DAP) Deep Anal Pressure (Yes/No)

MOTOR SUBSCORES

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

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

SENSORY SUBSCORES

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

PPR ____ + PPL ____ (MAX 56) (56) = PP TOTAL ____ (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) ____

(In injuries with absent motor OR sensory function in S4-5 only)

6. ZONE OF PARTIAL PRESERVATION

	R	L
SENSORY		
MOTOR		

(Most caudal levels with any innervation)

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What is an ASIA Assessment?

The ASIA exam is a standardised physical examination consisting of;

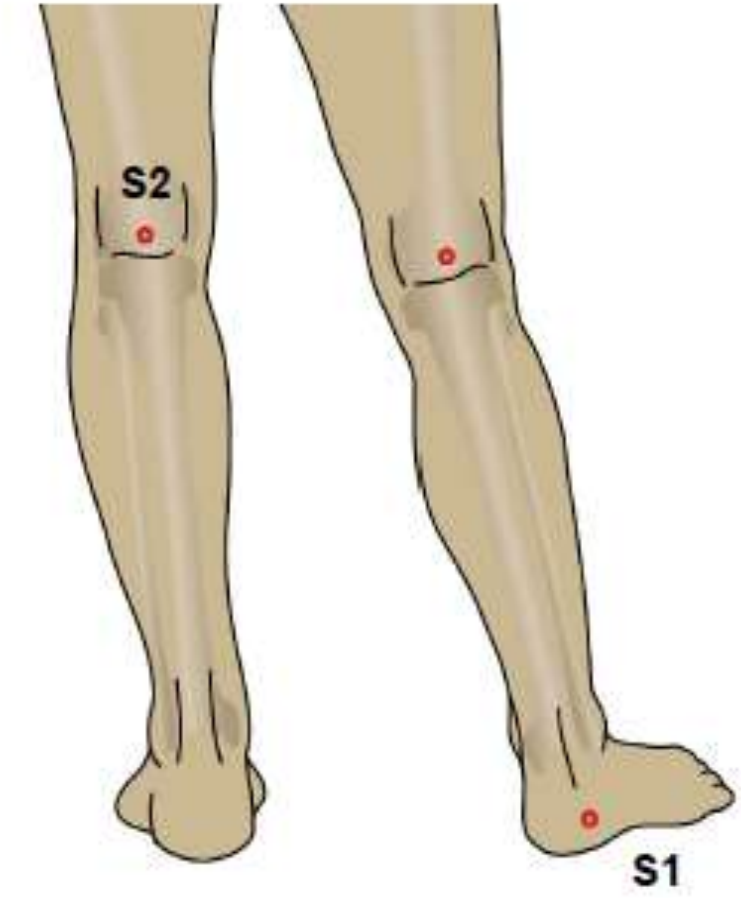
- Myotomal-based motor examination
- Dermatomal-based sensory examination
- Anorectal examination.

The aim of the ASIA scale is to provide;

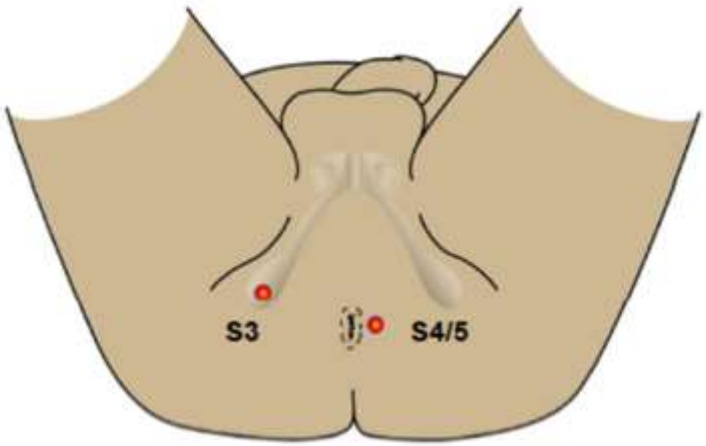
- standardised and detailed documentation of the SCI neurological level of injury;
- guidance for radiographic assessment and treatment, and
- to determine if the SCI is complete or incomplete.

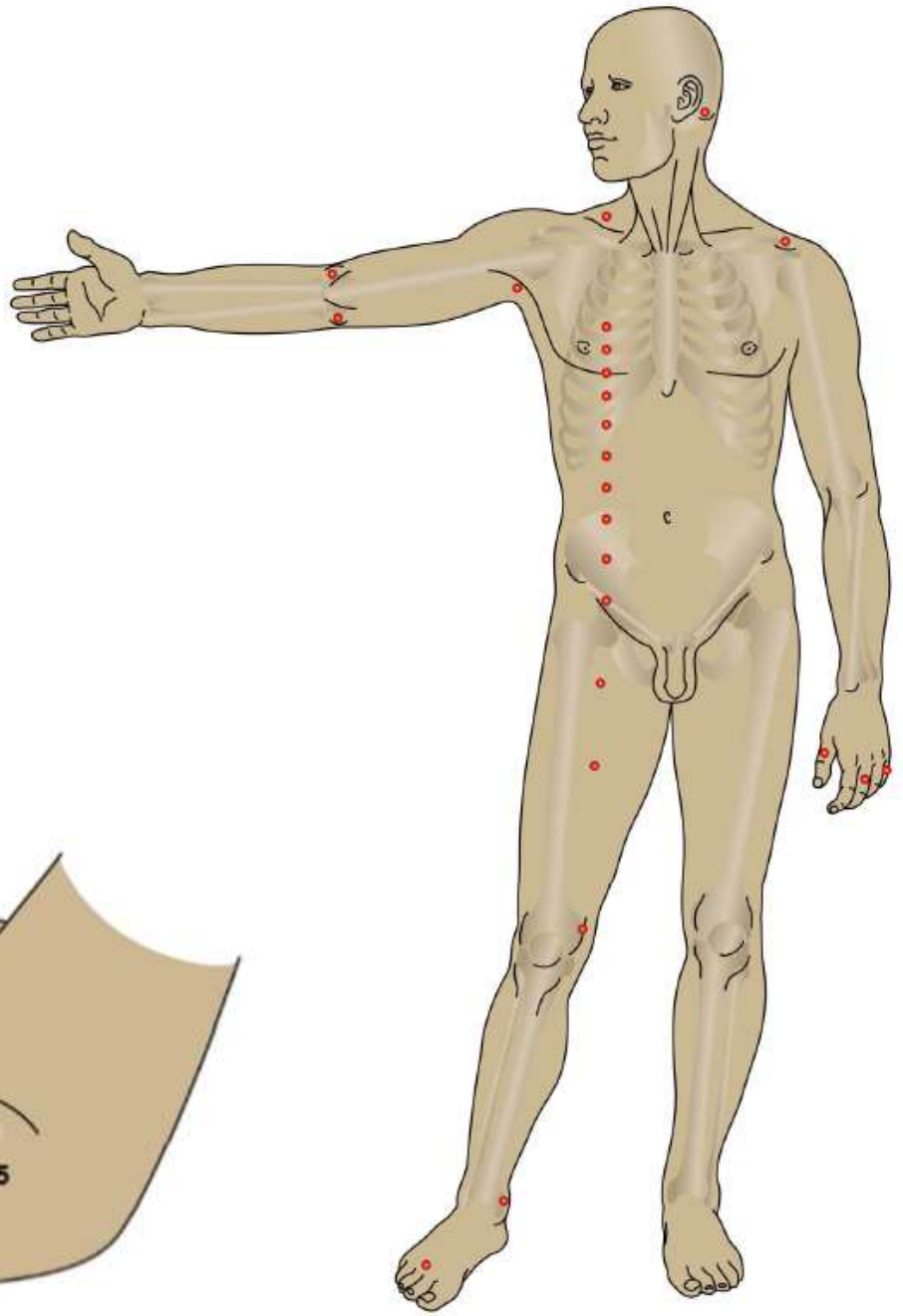
ASIA Key Sensory Points

Key_Sensory_Points.pdf (asia-spinalinjury.org)



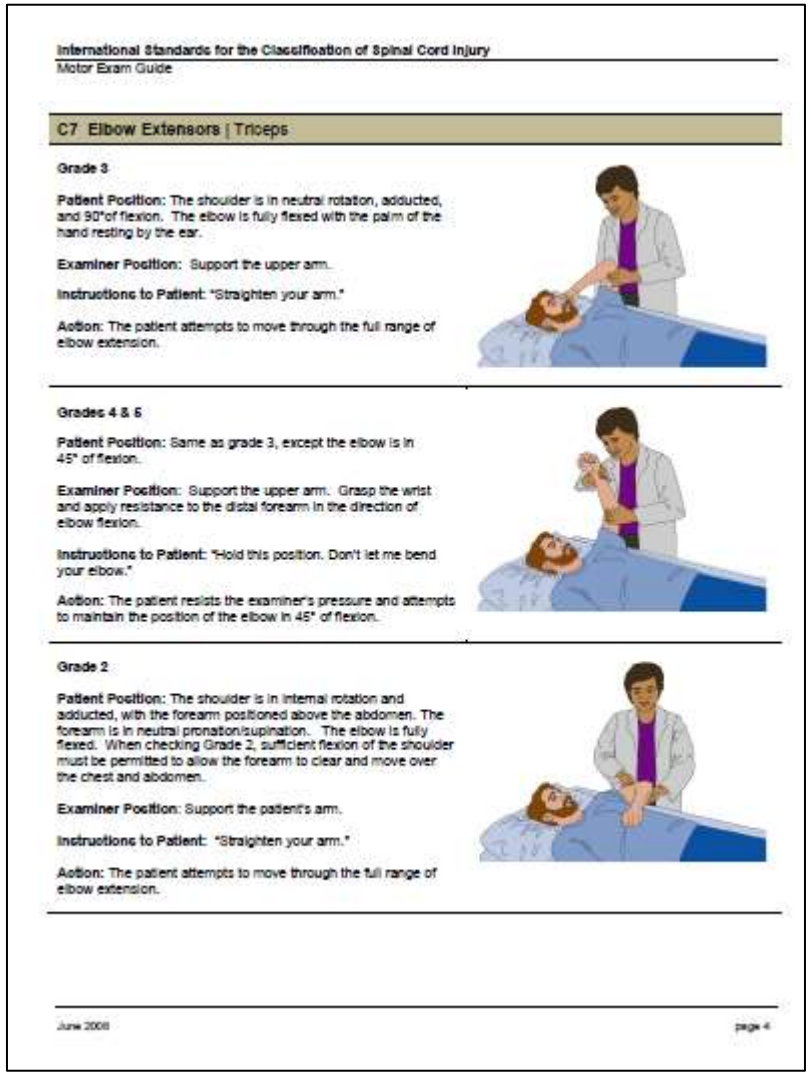
3 Point scale
0 Absent
1 Impaired
2 Normal
NT Not testable





ASIA Motor Exam guide

- Motor_Exam_Guide.pdf (asia-spinalinjury.org)



International Standards for the Classification of Spinal Cord Injury
Motor Exam Guide

C7 Elbow Extensors | Triceps

Grade 3

Patient Position: The shoulder is in neutral rotation, adducted, and 90°of flexion. The elbow is fully flexed with the palm of the hand resting by the ear.

Examiner Position: Support the upper arm.

Instructions to Patient: "Straighten your arm."

Action: The patient attempts to move through the full range of elbow extension.

Grades 4 & 5

Patient Position: Same as grade 3, except the elbow is in 45° of flexion.

Examiner Position: Support the upper arm. Grasp the wrist and apply resistance to the distal forearm in the direction of elbow flexion.

Instructions to Patient: "Hold this position. Don't let me bend your elbow."

Action: The patient resists the examiner's pressure and attempts to maintain the position of the elbow in 45° of flexion.

Grade 2

Patient Position: The shoulder is in internal rotation and adducted, with the forearm positioned above the abdomen. The forearm is in neutral pronation/supination. The elbow is fully flexed. When checking Grade 2, sufficient flexion of the shoulder must be permitted to allow the forearm to clear and move over the chest and abdomen.

Examiner Position: Support the patient's arm.

Instructions to Patient: "Straighten your arm."

Action: The patient attempts to move through the full range of elbow extension.

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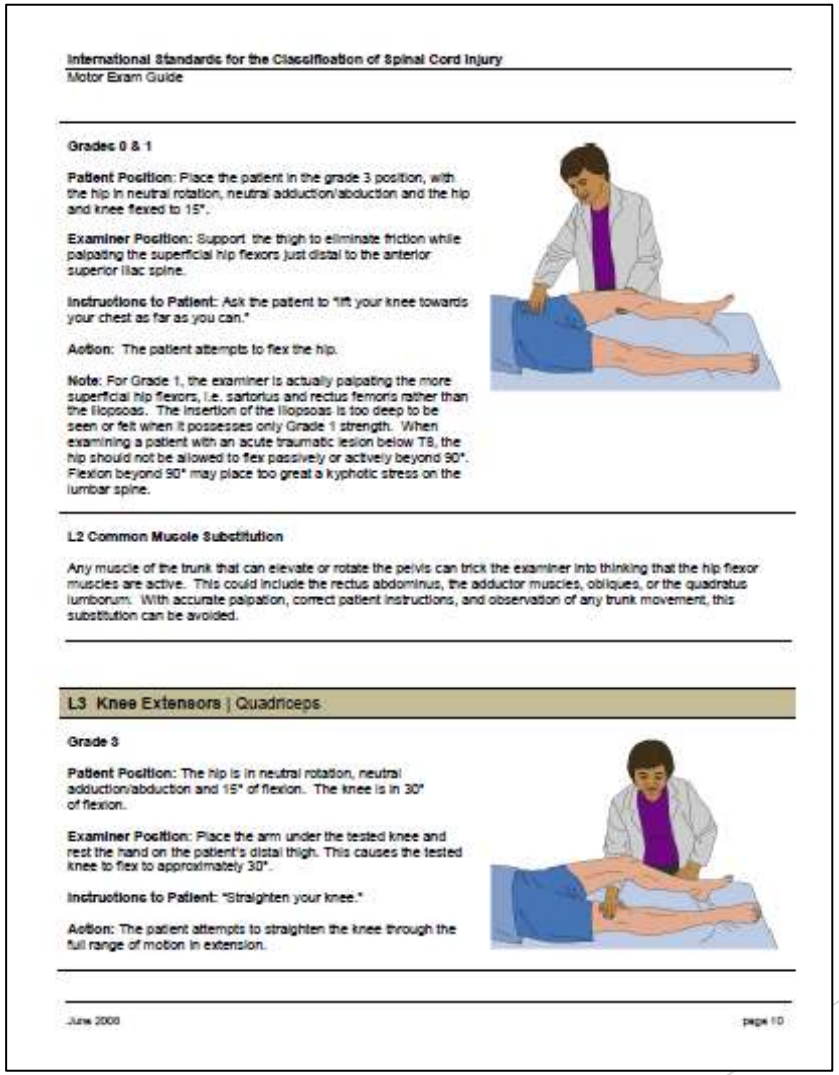

International Standards for the Classification of Spinal Cord Injury
Motor Exam Guide

Grades 0 & 1

Patient Position: Place the patient in the grade 3 position, with the hip in neutral rotation, neutral adduction/abduction and the hip and knee flexed to 15°.

Examiner Position: Support the thigh to eliminate friction while palpating the superficial hip flexors just distal to the anterior superior iliac spine.

Instructions to Patient: Ask the patient to "lift your knee towards your chest as far as you can."

Action: The patient attempts to flex the hip.

Note: For Grade 1, the examiner is actually palpating the more superficial hip flexors, i.e. sartorius and rectus femoris rather than the iliopsoas. The insertion of the iliopsoas is too deep to be seen or felt when it possesses only Grade 1 strength. When examining a patient with an acute traumatic lesion below T8, the hip should not be allowed to flex passively or actively beyond 90°. Flexion beyond 90° may place too great a kyphotic stress on the lumbar spine.

L2 Common Muscle Substitution

Any muscle of the trunk that can elevate or rotate the pelvis can trick the examiner into thinking that the hip flexor muscles are active. This could include the rectus abdominus, the adductor muscles, obliques, or the quadratus lumborum. With accurate palpation, correct patient instructions, and observation of any trunk movement, this substitution can be avoided.

L3 Knee Extensors | Quadriceps

Grade 3

Patient Position: The hip is in neutral rotation, neutral adduction/abduction and 15° of flexion. The knee is in 30° of flexion.

Examiner Position: Place the arm under the tested knee and rest the hand on the patient's distal thigh. This causes the tested knee to flex to approximately 30°.

Instructions to Patient: "Straighten your knee."

Action: The patient attempts to straighten the knee through the full range of motion in extension.

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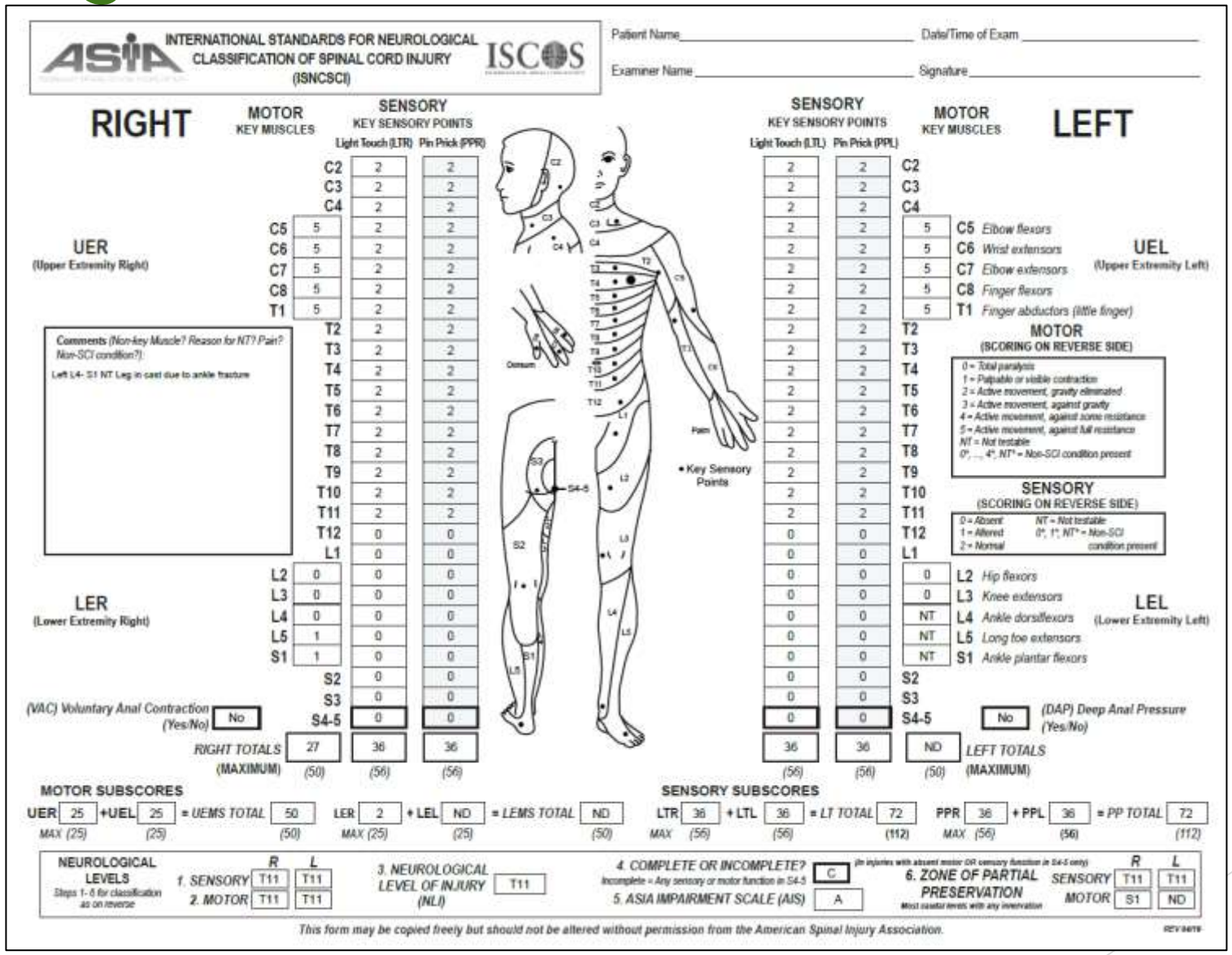
Muscle grading

0 absent
1 Flicker
2 Movement gravity eliminated
3 Against gravity
4 Against resistance
5 Normal

ASIA Algorithm



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

ISCOS

Patient Name _____ Date/Time of Exam _____

Examiner Name _____ Signature _____

RIGHT

	MOTOR KEY MUSCLES	SENSORY KEY SENSORY POINTS Light Touch (LTR)	Pin Prick (PPR)
C2		2	2
C3		2	2
C4		2	2
C5	5	2	2
C6	5	2	2
C7	5	2	2
C8	5	2	2
T1	5	2	2
T2		2	2
T3		2	2
T4		2	2
T5		2	2
T6		2	2
T7		2	2
T8		2	2
T9		2	2
T10		2	2
T11		2	2
T12		0	0
L1		0	0
L2	0	0	0
L3	0	0	0
L4	0	0	0
L5	1	0	0
S1	1	0	0
S2		0	0
S3		0	0
S4-5		0	0
RIGHT TOTALS (MAXIMUM)	27 (50)	36 (56)	36 (56)

LEFT

	SENSORY KEY SENSORY POINTS Light Touch (LTL)	Pin Prick (PPL)	MOTOR KEY MUSCLES
C2	2	2	
C3	2	2	
C4	2	2	
C5	2	2	5
C6	2	2	5
C7	2	2	5
C8	2	2	5
T1	2	2	5
T2	2	2	
T3	2	2	
T4	2	2	
T5	2	2	
T6	2	2	
T7	2	2	
T8	2	2	
T9	2	2	
T10	2	2	
T11	2	2	
T12	0	0	
L1	0	0	
L2	0	0	0
L3	0	0	0
L4	0	0	NT
L5	0	0	NT
S1	0	0	NT
S2	0	0	
S3	0	0	
S4-5	0	0	
LEFT TOTALS (MAXIMUM)	36 (56)	36 (56)	ND (50)

UER (Upper Extremity Right)

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
NT = Not testable
0*, ..., 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

LER (Lower Extremity Right)

LEL (Lower Extremity Left)

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

Comments (Non-key Muscle? Reason for NT? Pain? Non-SCI condition?):
Left L4- S1 NT Leg in cast due to ankle fracture

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

(DAP) Deep Anal Pressure (Yes/No): No

• Key Sensory Points

MOTOR SUBSCORES

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

LER 2 + LEL ND = LEMS TOTAL ND (MAX (25) (25) (50))

SENSORY SUBSCORES

LTR 36 + LTL 36 = LT TOTAL 72 (MAX (56) (56) (112))

PPR 36 + PPL 36 = PP TOTAL 72 (MAX (56) (56) (112))

NEUROLOGICAL LEVELS (Steps 1- 6 for classification as on reverse)	R	L
1. SENSORY	T11	T11
2. MOTOR	T11	T11

3. NEUROLOGICAL LEVEL OF INJURY (NLI): T11

4. COMPLETE OR INCOMPLETE? (Incomplete = Any sensory or motor function in S4-5): C

5. ASIA IMPAIRMENT SCALE (AIS): A

6. ZONE OF PARTIAL PRESERVATION (Most caudal levels with any innervation)

	R	L
SENSORY	T11	T11
MOTOR	S1	ND

(In injuries with absent motor OR sensory function in S4-5 only)

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[ISNCSCI Algorithm Calculator to score the ASIA Impairment Scale :: ISNCSCI Algorithm Calculator]

ASIA Impairment Scale

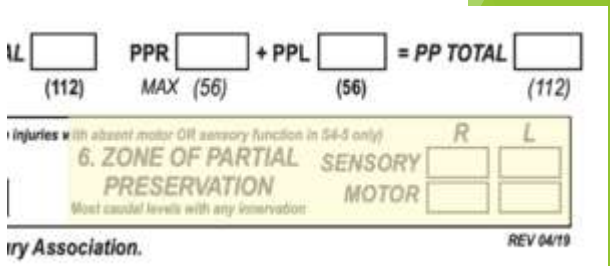
Grade	Type of Injury	Description of Injury
A	Complete	No sensory or motor function is preserved in sacral segments S4-S5, no sacral sparing
B	Sensory Incomplete	Sensory but not motor function is preserved below the neurological level and includes sacral segments S4-S5, AND No motor function is preserved more than three levels below the motor level on either side of the body
C	Motor Incomplete	Motor function is preserved below the neurological level AND More than half of the key muscle functions below the neurological level of injury have a muscle grade of less than 3 (Grades 0-2)
D	Motor Incomplete	Motor function is preserved below the neurological level AND At least half (half or more) of the key muscle functions below the neurological level of injury have a muscle grade ≥ 3
E	Normal	If sensation and motor function are graded as normal in all segments AND the patient had prior SCI-related deficits *Individuals without a spinal cord injury do not receive an AIS Grade.

Zone of Partial Preservation

- The **zone of partial preservation** refers to the dermatomes and myotomes caudal to the sensory or motor level that remain partially innervated.
- The extent of the sensory or motor ZPP is determined by the most caudal segment with some sensory or motor function respectively, and should be recorded for both right and left sides and for sensory and motor function.

•Motor ZPP is recorded in incomplete injuries with absent VAC.
•Sensory ZPP is recorded in the absence of sensory function in S4-5 (light touch and pin-prick), as long as DAP is not present.

•In the presence of DAP, Sensory ZPP should be noted as “not applicable (NA)”.
•In the absence of DAP, sensory ZPP can be recorded if there is absence of light touch and pin-prick sensation at S4-5, while it should be noted as “not applicable (NA)” if there is presence of light touch or pin-prick sensation at S4-5.



Test Your Learning

Going forwards, what would you like?

Thank you

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