The Expedited International Standards for Neurological Classification of SCI (E-ISNCSCI)-Version 2; June 2025

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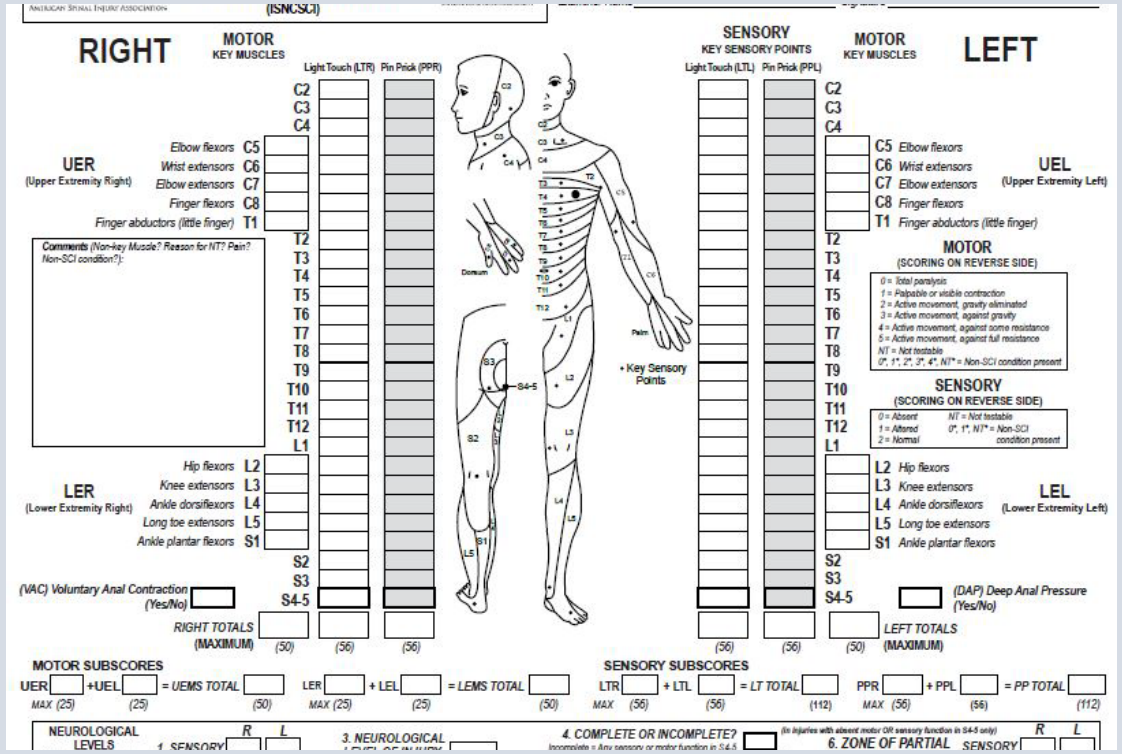
Views expressed in this presentation are my own and do not necessarily reflect those of the US Dept. of Veterans Affairs

Outline

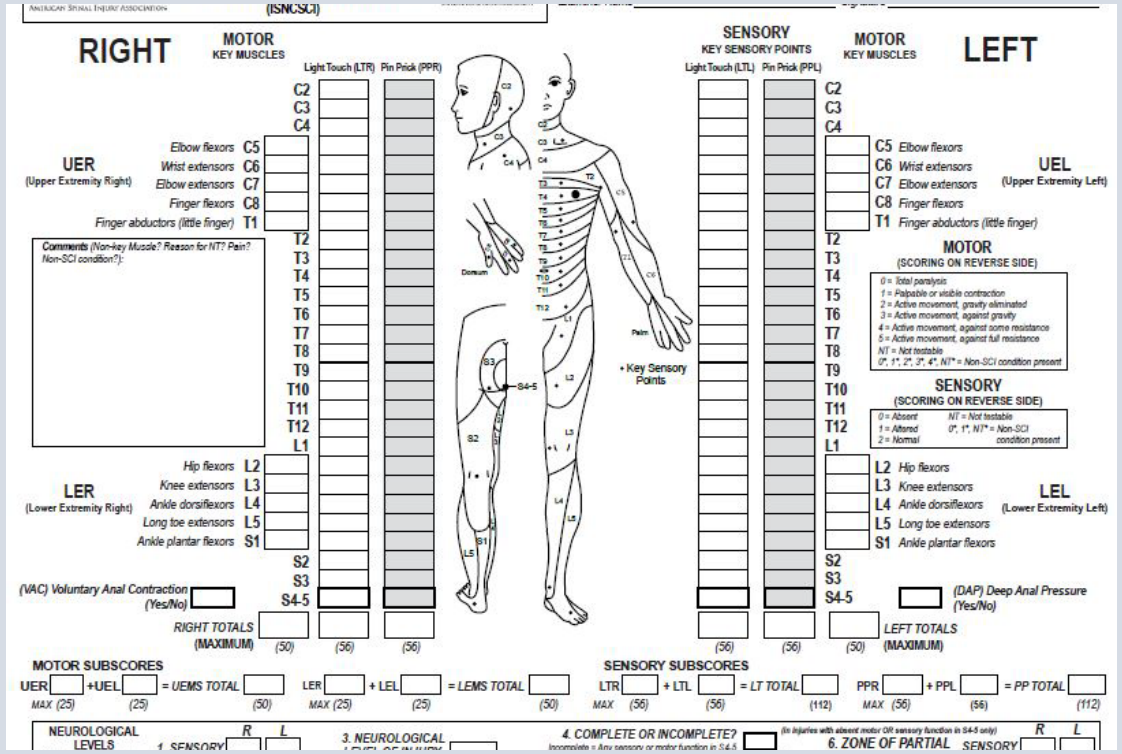
- *Rationale for developing E-ISNCSCI-V2*
- *Demonstration of testing sequence and typical reductions in total exam items*
- *Accuracy of classifications: NLI and AIS*
- *Suggested uses; limitations*

The “full” ISNCSCI



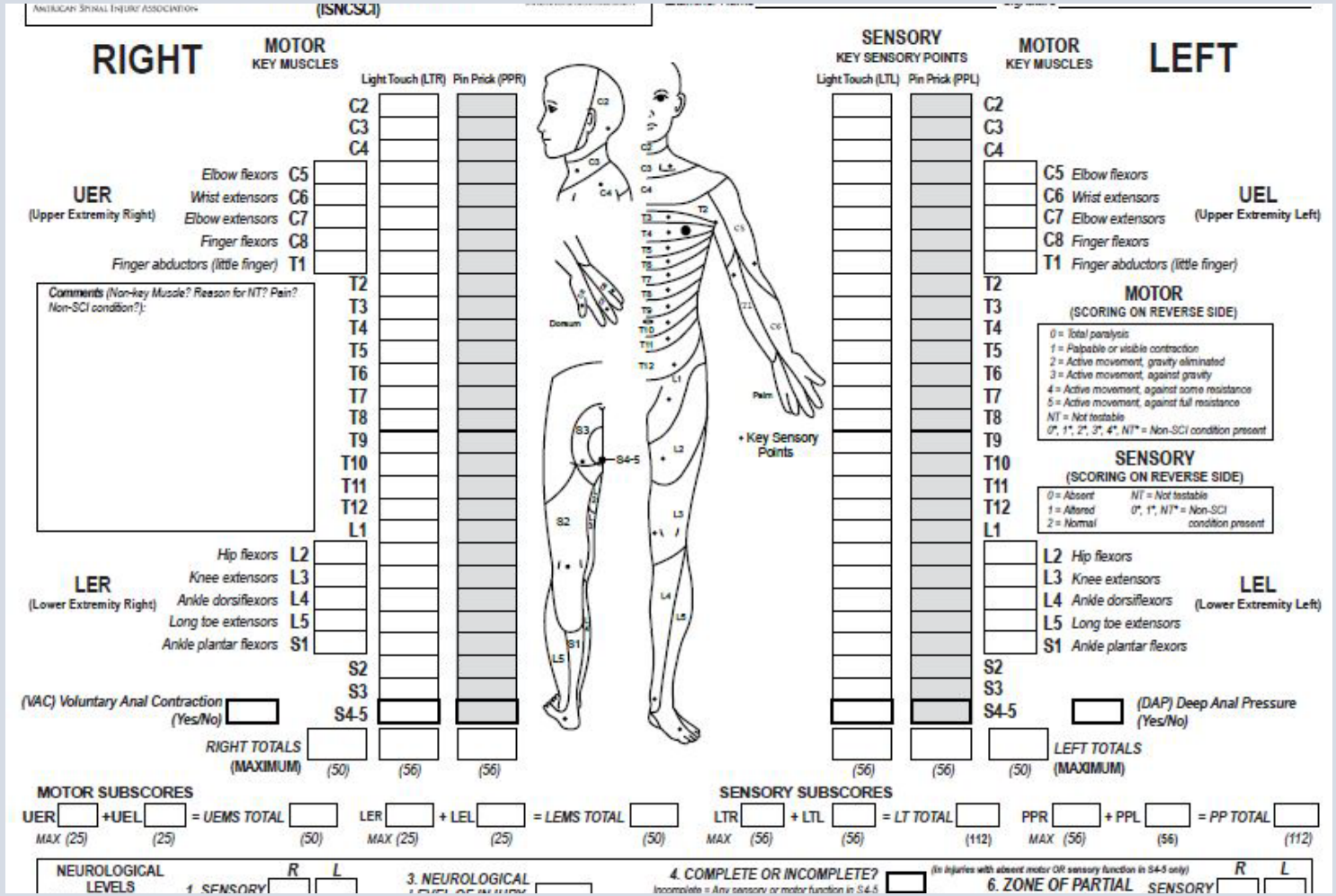
- “Standards for Neurological Classification of SCI” were first developed in the late 1980’s by ASIA
- Quickly became the “International Standards” and are widely used in clinical and research settings

The “full” ISNCSCI



- ISNCSCI includes a standardized examination and provides multiple neurologic classifications
- The classifications are a concise way to summarize important characteristics of the motor and sensory deficits commonly occurring following SCI
- Classifications as determined by ISNCSCI predict or are associated with:
  - Neurologic recovery
  - Functional outcomes
  - Medical complications
- For these reasons, ISNCSCI is used for much SCI research, regardless of whether the classifications are study outcomes

What is Examined for Full ISNCSCI?



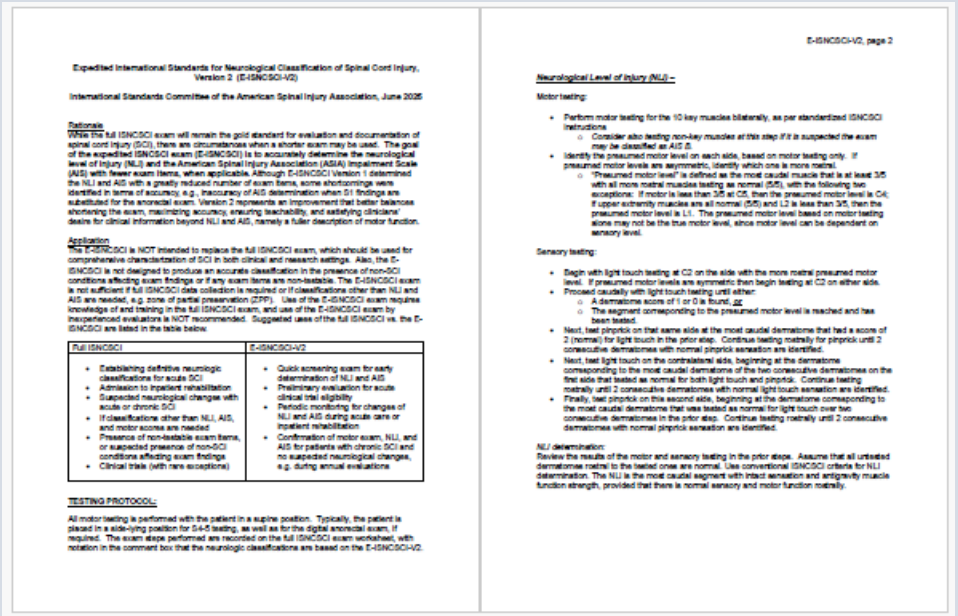
- 10 key muscle functions bilaterally
- 28 dermatomes bilaterally for light touch and pin-prick
- Digital rectal exam for deep anal pressure (DAP) and voluntary anal contraction (VAC)
- 134 items!!!

Expedited ISNCSCI (E-ISNCSCI)

- Rationale for development:
  - The full exam takes a long time. It would be great to have a shorter, standardized option
  - Some key classifications can be determined using fewer exam items
- Version 1 (2020)
  - Instructions were vague
  - Suggested many “shortcut options” that were not assessed for accuracy
- Version 2 (2025)
  - Precise instructions were developed
  - Accuracy of classifications (NLI and AIS) was determined
  - The prior shortcut option for substituting S1 findings for anorectal exam findings was eliminated due to inaccuracy of resulting AIS classifications
  - Validation: See Burns SP, et al., Development and validation of an algorithm for item reduction of the International Standards for Neurological Classification of Spinal Cord Injury examination to determine level and severity of SCI. *Top Spinal Cord Inj Rehabil* (August 2025). https://pubmed.ncbi.nlm.nih.gov/40873964/

Full ISNCSCI vs. E-ISNCSCI-V2

	Full ISNCSCI	E-ISNCSCI-V2
Exam -		
Motor (10 muscles bilaterally)	20 items	20 items
Sensory (28 dermatomes bilat; LT and pin)	112 items	21 items (avg.; 19% of full)
Anorectal exam (for DAP and VAC)	Always	Omit for most AIS C+D



Expedited International Standards for Neurological Classification of Spinal Cord Injury, Version 2 (E-ISNCSCI-V2)

International Standards Committee of the American Spinal Injury Association, June 2026

Rationale
While the full ISNCSCI exam will remain the gold standard for evaluation and documentation of spinal cord injury (SCI), there are circumstances when a shorter exam may be used. The goal of the expedited ISNCSCI exam (E-ISNCSCI) is to accurately determine the neurological level of injury (NLI) and the American Spinal Injury Association (ASIA) Impairment Scale (AIS) with fewer exam items, when applicable. Although E-ISNCSCI Version 1 determined the NLI and AIS with a greatly reduced number of exam items, some shortcomings were identified in terms of accuracy, e.g., inaccuracy of AIS determination when S1 findings are substituted for the anorectal exam. Version 2 represents an improvement that better balances shortening the exam, maximizing accuracy, ensuring teachability, and satisfying clinicians' desire for clinical information beyond NLI and AIS, namely a fuller description of motor function.

Application
The E-ISNCSCI is NOT intended to replace the full ISNCSCI exam, which should be used for comprehensive characterization of SCI in both clinical and research settings. Also, the E-ISNCSCI is not designed to produce an accurate classification in the presence of non-SCI conditions affecting exam findings or if any exam items are non-testable. The E-ISNCSCI exam is not sufficient if full ISNCSCI data collection is required or if classifications other than NLI and AIS are needed, e.g. zone of partial preservation (ZPP). Use of the E-ISNCSCI exam requires knowledge of and training in the full ISNCSCI exam, and use of the E-ISNCSCI exam by inexperienced evaluators is NOT recommended. Suggested uses of the full ISNCSCI vs. the E-ISNCSCI are listed in the table below.

Full ISNCSCI	E-ISNCSCI-V2
• Establishing definitive neurologic classifications for acute SCI • Admission to inpatient rehabilitation • Suspected neurological changes with acute or chronic SCI • If classifications other than NLI, AIS, and motor scores are needed • Presence of non-testable exam items, or suspected presence of non-SCI conditions affecting exam findings • Clinical trials (with rare exceptions)	• Quick screening exam for early determination of NLI and AIS • Preliminary evaluation for acute clinical trial eligibility • Periodic monitoring for changes of NLI and AIS during acute care or inpatient rehabilitation • Confirmation of motor exam, NLI, and AIS for patients with chronic SCI and no suspected neurological changes, e.g. during annual evaluations

TESTING PROTOCOL:

All motor testing is performed with the patient in a supine position. Typically, the patient is placed in a side-lying position for S4-5 testing, as well as for the digital anorectal exam, if required. The exam steps performed are recorded on the full ISNCSCI exam worksheet, with notation in the comment box that the neurologic classifications are based on the E-ISNCSCI-V2.

E-ISNCSCI-V2, page 2

Neurological Level of Injury (NLI) –

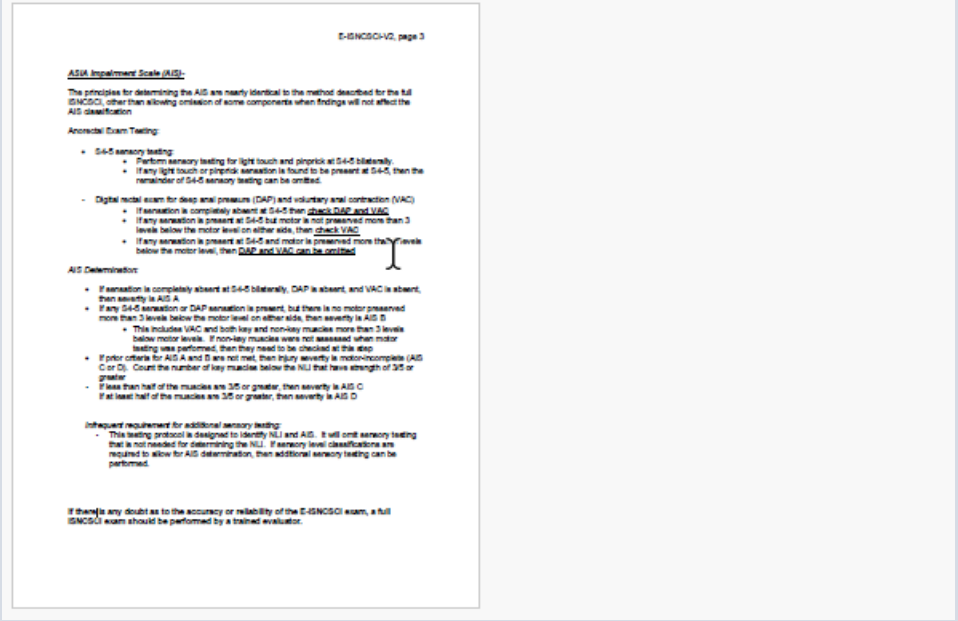
Motor testing:

- Perform motor testing for the 10 key muscles bilaterally, as per standardized ISNCSCI instructions
  - *Consider also testing non-key muscles at this step if it is suspected the exam may be classified as AIS B.*
- Identify the presumed motor level on each side, based on motor testing only. If presumed motor levels are asymmetric, identify which one is more rostral.
  - "Presumed motor level" is defined as the most caudal muscle that is at least 3/5 with all more rostral muscles testing as normal (5/5), with the following two exceptions: If motor is less than 3/5 at C5, then the presumed motor level is C4; If upper extremity muscles are all normal (5/5) and L2 is less than 3/5, then the presumed motor level is L1. The presumed motor level based on motor testing alone may not be the true motor level, since motor level can be dependent on sensory level.

Sensory testing:

- Begin with light touch testing at C2 on the side with the more rostral presumed motor level. If presumed motor levels are symmetric then begin testing at C2 on either side.
- Proceed caudally with light touch testing until either:
  - A dermatome score of 1 or 0 is found, *or*
  - The segment corresponding to the presumed motor level is reached and has been tested.
- Next, test pinprick on that same side at the most caudal dermatome that had a score of 2 (normal) for light touch in the prior step. Continue testing rostrally for pinprick until 2 consecutive dermatomes with normal pinprick sensation are identified.
- Next, test light touch on the contralateral side, beginning at the dermatome corresponding to the most caudal dermatome of the two consecutive dermatomes on the first side that tested as normal for both light touch and pinprick. Continue testing rostrally until 2 consecutive dermatomes with normal light touch sensation are identified.
- Finally, test pinprick on this second side, beginning at the dermatome corresponding to the most caudal dermatome that was tested as normal for light touch over two consecutive dermatomes in the prior step. Continue testing rostrally until 2 consecutive dermatomes with normal pinprick sensation are identified.

NLI determination:
Review the results of the motor and sensory testing in the prior steps. Assume that all untested dermatomes rostral to the tested ones are normal. Use conventional ISNCSCI criteria for NLI determination. The NLI is the most caudal segment with intact sensation and antigravity muscle function strength, provided that there is normal sensory and motor function rostrally.



E-ISNCSCI-V2, page 3

ASIA Impairment Scale (AIS)-

The principles for determining the AIS are nearly identical to the method described for the full ISNCSCI, other than allowing omission of some components when findings will not affect the AIS classification

Anorectal Exam Testing:

- S4-5 sensory testing:
  - Perform sensory testing for light touch and pinprick at S4-5 bilaterally.
  - If any light touch or pinprick sensation is found to be present at S4-5, then the remainder of S4-5 sensory testing can be omitted.
- Digital rectal exam for deep anal pressure (DAP) and voluntary anal contraction (VAC)
  - If sensation is completely absent at S4-5 then check DAP and VAC
  - If any sensation is present at S4-5 but motor is not preserved more than 3 levels below the motor level on either side, then check VAC
  - If any sensation is present at S4-5 and motor is preserved more than 3 levels below the motor level, then DAP and VAC can be omitted

AIS Determination:

- If sensation is completely absent at S4-5 bilaterally, DAP is absent, and VAC is absent, then severity is AIS A
- If any S4-5 sensation or DAP sensation is present, but there is no motor preserved more than 3 levels below the motor level on either side, then severity is AIS B
  - This includes VAC and both key and non-key muscles more than 3 levels below motor levels. If non-key muscles were not assessed when motor testing was performed, then they need to be checked at this step
- If prior criteria for AIS A and B are not met, then injury severity is motor-incomplete (AIS C or D). Count the number of key muscles below the NLI that have strength of 3/5 or greater
  - If less than half of the muscles are 3/5 or greater, then severity is AIS C
  - If at least half of the muscles are 3/5 or greater, then severity is AIS D

Infrequent requirement for additional sensory testing:
- This testing protocol is designed to identify NLI and AIS. It will omit sensory testing that is not needed for determining the NLI. If sensory level classifications are required to allow for AIS determination, then additional sensory testing can be performed.

If there is any doubt as to the accuracy or reliability of the E-ISNCSCI exam, a full ISNCSCI exam should be performed by a trained evaluator.

3-Page Testing Protocol – posted to ASIA website

Overview of Testing Sequence for E-ISNCSCI-V2

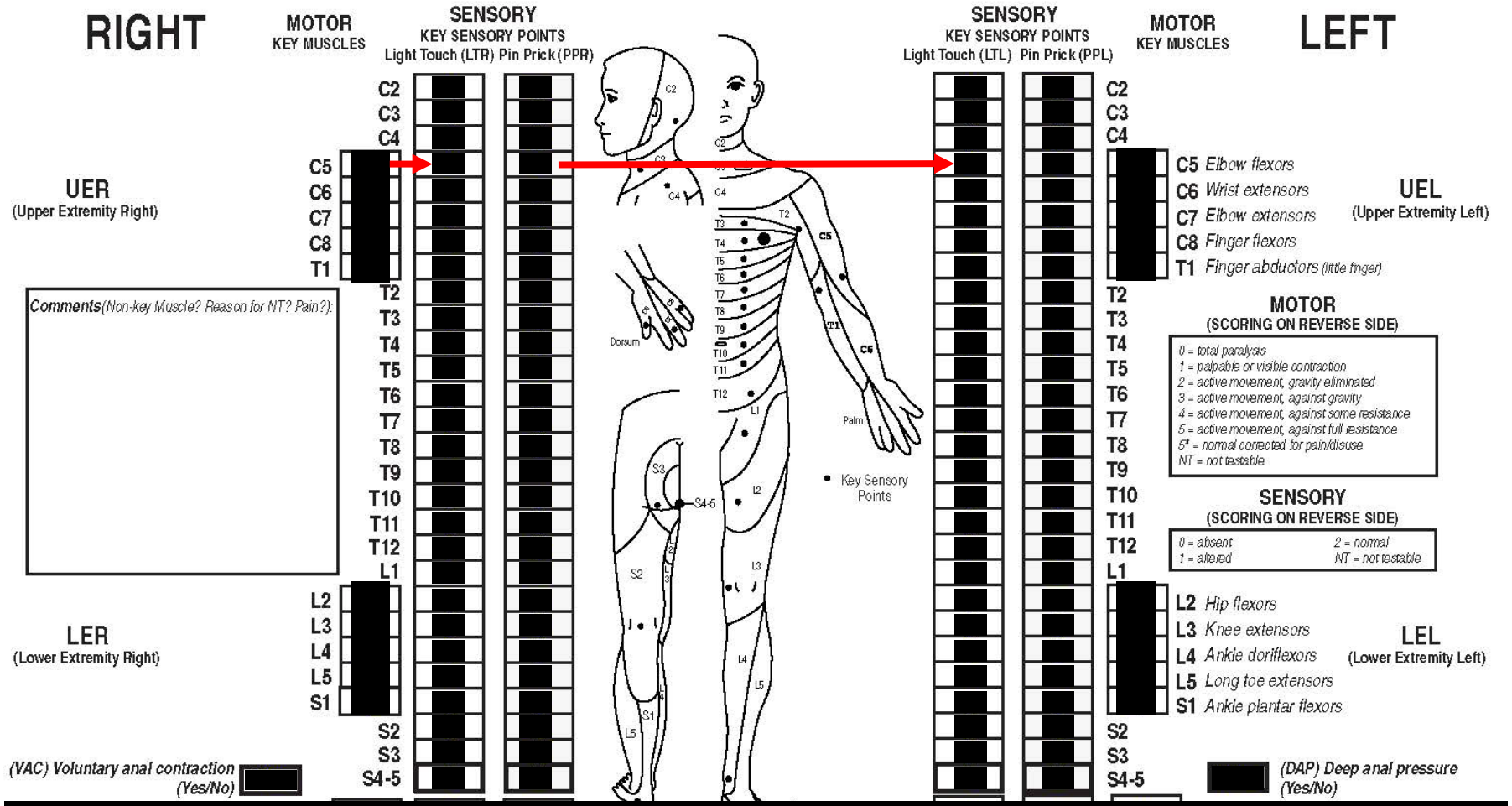
1. Perform full motor testing (10 muscles bilaterally)
2. Perform the minimum amount of sensory exam item testing (light touch and pin prick) needed to identify **NLI**.
3. Perform the minimum amount of “sacral sparing” exam item (S4-5 sensation and digital rectal exam) testing needed to identify the **AIS**.

Demonstration of Testing Sequence (Case #1 on ASIA website)

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

Patient Name E-ISNCSCI Case 2025-01 Date/Time of Exam _____

Examiner Name _____ Signature _____



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

[redacted]

[redacted]

Blue boxes = what was tested

31 exam steps

23% of full exam

Note: no anorectal exam, and only partial S4-5 testing

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

Patient Name: E-ISNCSCI Case 2025-01 Date/Time of Exam:

Examiner Name: Signature:

RIGHT

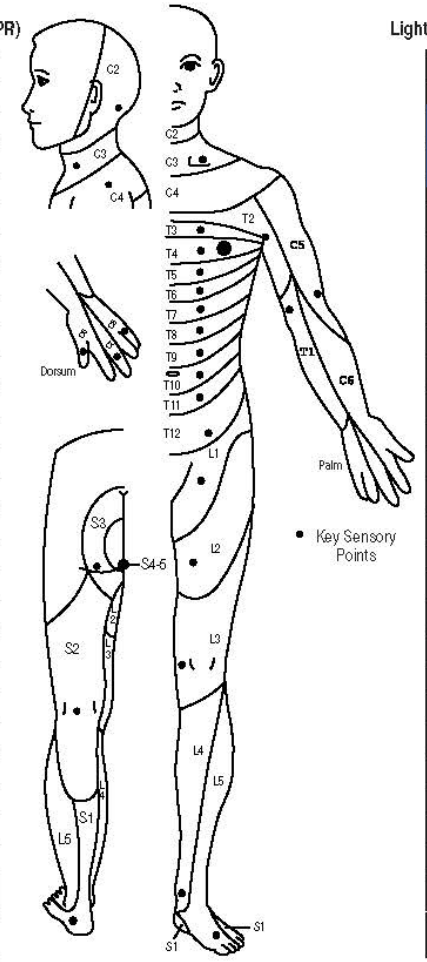
	MOTOR KEY MUSCLES	SENSORY KEY SENSORY POINTS Light Touch (LTR)	Pin Prick (PPR)
C2		2	2
C3		2	2
C4		2	2
C5	5	2	2
C6	2	2	2
C7	1	1	1
C8	0	1	1
T1	0	1	1
T2		1	1
T3		1	1
T4		1	1
T5		1	1
T6		1	1
T7		1	1
T8		1	1
T9		1	1
T10		1	1
T11		1	1
T12		1	1
L1		1	1
L2	3	1	1
L3	4	1	1
L4	4	1	1
L5	3	1	1
S1	4	1	1
S2		1	1
S3		1	1
S4-5		1	1
RIGHT TOTALS (MAXIMUM)	26 (50)	33 (56)	33 (56)

UER (Upper Extremity Right)

LER (Lower Extremity Right)

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

(VAC) Voluntary anal contraction (Yes/No): Yes



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	1	1	2
C7	1	1	2
C8	1	1	2
T1	1	1	1
T2	1	1	
T3	1	1	
T4	1	1	
T5	1	1	
T6	1	1	
T7	1	1	
T8	1	1	
T9	1	1	
T10	1	1	
T11	1	1	
T12	1	1	
L1	1	1	
L2	1	1	5
L3	1	1	5
L4	1	1	4
L5	1	1	4
S1	1	1	4
S2	1	1	
S3	1	1	
S4-5	1	1	
LEFT TOTALS (MAXIMUM)	32 (56)	32 (56)	34 (50)

UEL (Upper Extremity Left)

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

LEL (Lower Extremity Left)

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

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): Yes

MOTOR SUBSCORES

UER 8 (MAX 25) + UEL 12 (25) = *UEMS TOTAL* 20 (50)

LER 18 (MAX 25) + LEL 22 (25) = *LEMS TOTAL* 40 (50)

SENSORY SUBSCORES

LTR 33 (MAX 56) + LTL 32 (56) = *LT TOTAL* 65 (112)

PPR 33 (MAX 56) + PPL 32 (56) = *PP TOTAL* 65 (112)

NEUROLOGICAL LEVELS (Steps 1-5 for classification as on reverse)

	R	L
1.SENSORY	C6	C5
2.MOTOR	C5	C5

3.NEUROLOGICAL LEVEL OF INJURY (NLI): C5

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

5.ASIA IMPAIRMENT SCALE (AIS): D

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

	R	L
SENSORY	NA	NA
MOTOR	NA	NA

Generated by EMSCI'S ISNCSCI calculator https://ais.emsci.org

computationally classified by libISNCSI 11; libCGI 19.38 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 E-ISNCSCI Case 2025-01 Date/Time of Exam _____

Examiner Name _____ Signature _____

RIGHT

		MOTOR KEY MUSCLES	SENSORY KEY SENSORY POINTS Light Touch (LTR)	Pin Prick (PPR)
	C2		2	
	C3		2	
	C4		2	2
Elbow flexors	C5	5	2	2
Wrist extensors	C6	2		
Elbow extensors	C7	1		
Finger flexors	C8	0		
Finger abductors (little finger)	T1	0		
	T2			
	T3			
	T4			
	T5			
	T6			
	T7			
	T8			
	T9			
	T10			
	T11			
	T12			
	L1			
Hip flexors	L2	3		
Knee extensors	L3	4		
Ankle dorsiflexors	L4	4		
Long toe extensors	L5	3		
Ankle plantar flexors	S1	4		
	S2			
	S3			
	S4-5		1	
RIGHT TOTALS				
(MAXIMUM)		(50)	(56)	(56)

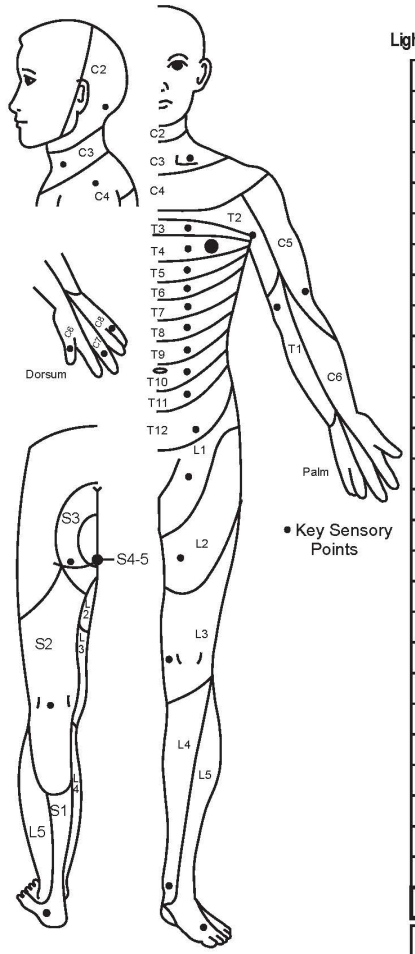
UER (Upper Extremity Right)

LER (Lower Extremity Right)

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

Classified using E-ISNCSCI-V2

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



LEFT

		SENSORY KEY SENSORY POINTS Light Touch (LTL)	Pin Prick (PPL)	MOTOR KEY MUSCLES	
	C2				
	C3				
	C4	2	2		
Elbow flexors	C5	2	2	5	
Wrist extensors	C6			2	
Elbow extensors	C7			2	
Finger flexors	C8			2	
Finger abductors (little finger)	T1			1	
	T2				
	T3				
	T4				
	T5				
	T6				
	T7				
	T8				
	T9				
	T10				
	T11				
	T12				
	L1				
Hip flexors	L2			5	
Knee extensors	L3			5	
Ankle dorsiflexors	L4			4	
Long toe extensors	L5			4	
Ankle plantar flexors	S1			4	
	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 8 + UEL 12 = *UEMS TOTAL* 20 (MAX (25) (25) (50))

LER 18 + LEL 22 = *LEMS TOTAL* 40 (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) C5

4. COMPLETE OR INCOMPLETE? ☐ *Incomplete = Any sensory or motor function in S4-5*

5. ASIA IMPAIRMENT SCALE (AIS) D

6. ZONE OF PARTIAL PRESERVATION *Most caudal levels with any innervation* (In injuries with absent motor OR sensory function in S4-5 only)

	R	L
SENSORY		
MOTOR		

Page 1/2

REV 04/19

How the standard worksheet should be completed for E-ISNCSCI-V2

Next: more examples showing the minimum required exam item testing (but not demonstrating the sequence of testing):

- First three are the other teaching cases on ASIA website
- Fourth is a recent case from my SCI unit

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

ASIA American Spinal Injury Association — ISCOS International Spinal Cord Society

Patient Name E-ISNCSCI Case 2025-02 Date/Time of Exam _____

Examiner Name _____ Signature _____

RIGHT

		MOTOR KEY MUSCLES	SENSORY KEY SENSORY POINTS Light Touch (LTR)	Pin Prick (PPR)
	C2		2	
	C3		2	
	C4		2	
Elbow flexors	C5	5	2	2
Wrist extensors	C6	5	2	2
Elbow extensors	C7	3	1	
Finger flexors	C8	0		
Finger abductors (little finger)	T1	0		
	T2			
	T3			
	T4			
	T5			
	T6			
	T7			
	T8			
	T9			
	T10			
	T11			
	T12			
	L1			
Hip flexors	L2	0		
Knee extensors	L3	0		
Ankle dorsiflexors	L4	0		
Long toe extensors	L5	0		
Ankle plantar flexors	S1	0		
	S2			
	S3			
	S4-5		1	
RIGHT TOTALS (MAXIMUM)			(50)	(56) (56)

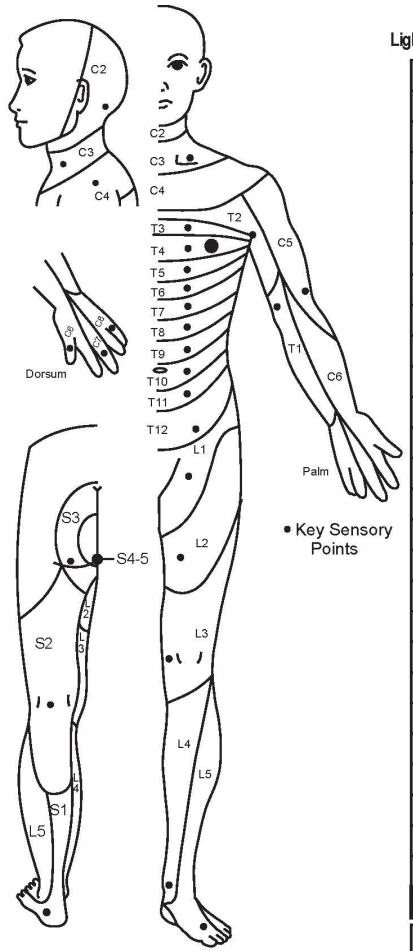
UER (Upper Extremity Right)

LER (Lower Extremity Right)

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

Classified using E-ISNCSCI-V2

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



• Key Sensory Points

LEFT

		SENSORY KEY SENSORY POINTS Light Touch (LTL)	Pin Prick (PPL)	MOTOR KEY MUSCLES
	C2			
	C3			
	C4	2	2	
Elbow flexors	C5	2	2	5
Wrist extensors	C6	1		5
Elbow extensors	C7			4
Finger flexors	C8			0
Finger abductors (little finger)	T1			0
	T2			
	T3			
	T4			
	T5			
	T6			
	T7			
	T8			
	T9			
	T10			
	T11			
	T12			
	L1			
Hip flexors	L2			0
Knee extensors	L3			0
Ankle dorsiflexors	L4			0
Long toe extensors	L5			0
Ankle plantar flexors	S1			0
	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 13 + UEL 14 = UEMS TOTAL 27 (MAX (25) (25) (50))

LER 0 + LEL 0 = LEMS TOTAL 0 (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): C5

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

5. ASIA IMPAIRMENT SCALE (AIS): B

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

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

	R	L
SENSORY		
MOTOR		

REV 04/19

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

American Spinal Injury Association — ISCOS International Spinal Cord Society

Patient Name E-ISNCSCI Case 2025-03 Date/Time of Exam _____

Examiner Name _____ Signature _____

RIGHT

		MOTOR KEY MUSCLES	SENSORY KEY SENSORY POINTS Light Touch (LTR)	Pin Prick (PPR)
	C2		2	
	C3		2	
	C4		2	
Elbow flexors	C5	5	2	
Wrist extensors	C6	5	2	
Elbow extensors	C7	5	2	
Finger flexors	C8	5	2	
Finger abductors (little finger)	T1	5	2	
	T2		2	
	T3		2	
	T4		2	
	T5		2	
	T6		2	
	T7		2	2
	T8		2	2
	T9		1	
	T10			
	T11			
	T12			
	L1			
Hip flexors	L2	1		
Knee extensors	L3	2		
Ankle dorsiflexors	L4	2		
Long toe extensors	L5	1		
Ankle plantar flexors	S1	1		
	S2			
	S3			
	S4-5		1	
RIGHT TOTALS (MAXIMUM)			(50)	(56) (56)

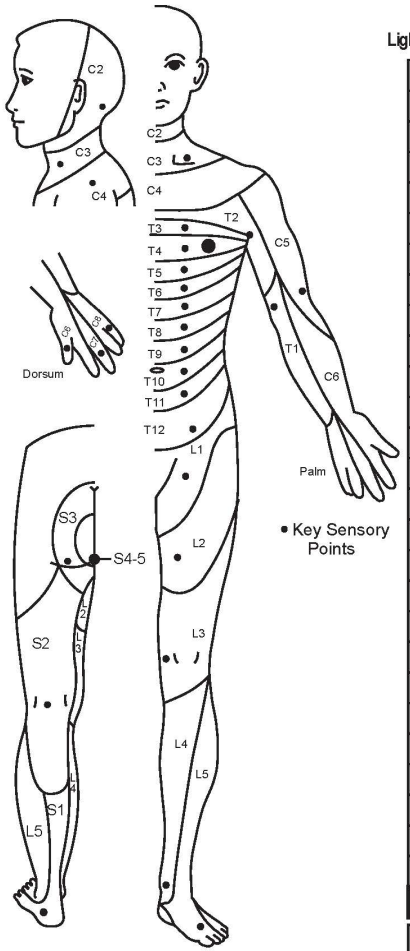
UER (Upper Extremity Right)

LER (Lower Extremity Right)

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

Classified using E-ISNCSCI-V2

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



• Key Sensory Points

LEFT

		MOTOR KEY MUSCLES	SENSORY KEY SENSORY POINTS Light Touch (LTL)	Pin Prick (PPL)
	C2			
	C3			
	C4			
Elbow flexors	C5	5		
Wrist extensors	C6	5		
Elbow extensors	C7	5		
Finger flexors	C8	5		
Finger abductors (little finger)	T1	5		
	T2			
	T3			
	T4			
	T5			
	T6		2	2
	T7		2	2
	T8		1	
	T9			
	T10			
	T11			
	T12			
	L1			
Hip flexors	L2	0		
Knee extensors	L3	1		
Ankle dorsiflexors	L4	1		
Long toe extensors	L5	0		
Ankle plantar flexors	S1	0		
	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 25 + UEL 25 = UEMS TOTAL 50 (MAX 25) (25) (50)

LER 7 + LEL 2 = LEMS TOTAL 9 (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): T7

4. COMPLETE OR INCOMPLETE? ☐ Incomplete = Any sensory or motor function in S4-5

5. ASIA IMPAIRMENT SCALE (AIS): C

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

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

	R	L
SENSORY		
MOTOR		

REV 04/19

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

ASIA American Spinal Injury Association — ISCOS International Spinal Cord Society

Patient Name E-ISNCSCI Case 2025-04 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			
Elbow flexors	C5	5		
Wrist extensors	C6	5		
Elbow extensors	C7	5		
Finger flexors	C8	5		
Finger abductors (little finger)	T1	5		
	T2			
	T3			
	T4			
	T5			
	T6			
	T7			
	T8			
	T9			
	T10			
	T11			
	T12			
	L1			
Hip flexors	L2	5	2	2
Knee extensors	L3	5	2	2
Ankle dorsiflexors	L4	4		
Long toe extensors	L5	2		
Ankle plantar flexors	S1	0		
	S2			
	S3			
	S4-5		0	0
RIGHT TOTALS (MAXIMUM)			(50)	(56) (56)

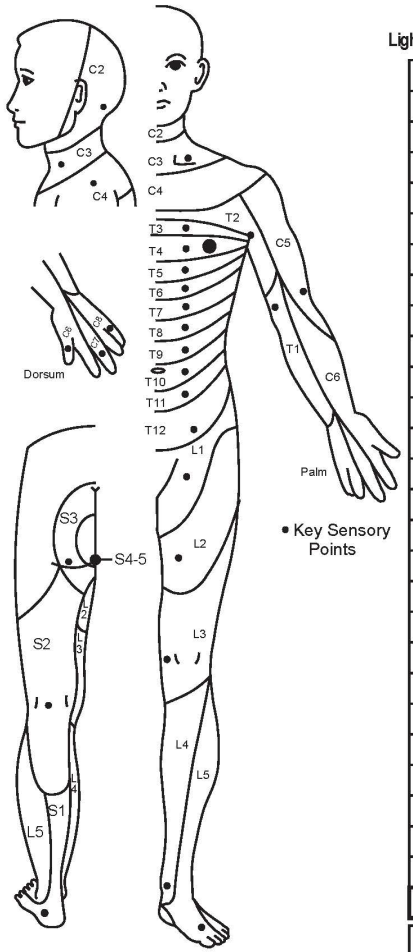
UER (Upper Extremity Right)

LER (Lower Extremity Right)

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

Classified using E-ISNCSCI-V2

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



LEFT

		SENSORY KEY SENSORY POINTS Light Touch (LTL)	SENSORY KEY SENSORY POINTS Pin Prick (PPL)	MOTOR KEY MUSCLES
	C2	2		
	C3	2		
	C4	2		
Elbow flexors	C5	2		5
Wrist extensors	C6	2		5
Elbow extensors	C7	2		5
Finger flexors	C8	2		5
Finger abductors (little finger)	T1	2		5
	T2	2		
	T3	2		
	T4	2		
	T5	2		
	T6	2		
	T7	2		
	T8	2		
	T9	2		
	T10	2		
	T11	2		
	T12	2		
	L1	2		
Hip flexors	L2	2	2	5
Knee extensors	L3	2	2	3
Ankle dorsiflexors	L4			1
Long toe extensors	L5			0
Ankle plantar flexors	S1			0
	S2			
	S3			
	S4-5	0	0	
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 *NT = Not testable*
1 = Altered *0*, 1*, NT* = Non-SCI condition present*
2 = Normal

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

MOTOR SUBSCORES

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

LER 16 + LEL 9 = *LEMS TOTAL* 25 (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) L3

4. COMPLETE OR INCOMPLETE? ____
Incomplete = Any sensory or motor function in S4-5

5. ASIA IMPAIRMENT SCALE (AIS) A

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

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

	R	L
SENSORY		
MOTOR		

REV 04/19

Nearly the maximum items that would typically be required

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 _____

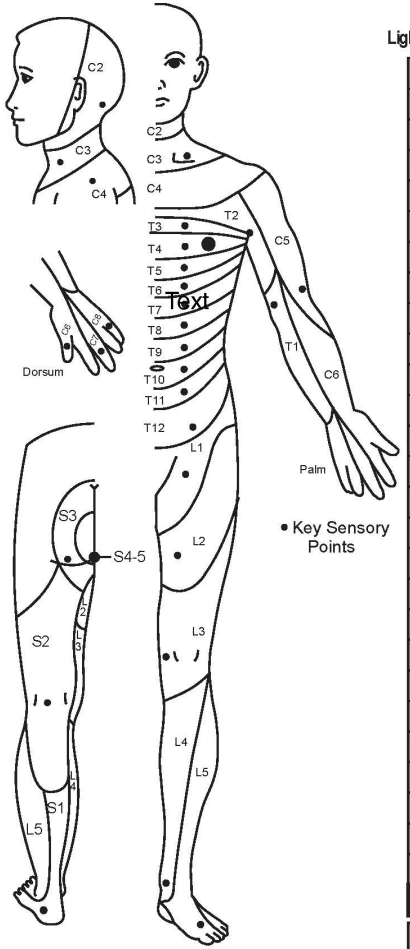
Examiner Name _____ Signature _____

RIGHT

	MOTOR KEY MUSCLES		SENSORY KEY SENSORY POINTS Light Touch (LTR)	Pin Prick (PPR)
		C2	1	
		C3		
		C4		
UER (Upper Extremity Right)	*Elbow flexors*	C5	4	
	Wrist extensors	C6	4	
	Elbow extensors	C7	3	
	Finger flexors	C8	3	
	Finger abductors (little finger)	T1	2	
		T2		
		T3		
		T4		
		T5		
		T6		
		T7		
		T8		
		T9		
		T10		
		T11		
		T12		
		L1		
LER (Lower Extremity Right)	*Hip flexors*	L2	4	
	Knee extensors	L3	4	
	Ankle dorsiflexors	L4	5	
	Long toe extensors	L5	5	
	Ankle plantar flexors	S1	4	
		S2		
		S3		
		S4-5	1	
	RIGHT TOTALS (MAXIMUM)		(50)	(56) (56)

Comments *(Non-key Muscle? Reason for NT? Pain? Non-SCI condition?):*
Classified using E-ISNCSCI-V2

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



LEFT

	SENSORY KEY SENSORY POINTS Light Touch (LTL)	Pin Prick (PPL)	MOTOR KEY MUSCLES	
			C2	
			C3	
			C4	
			5	C5 *Elbow flexors*
			5	C6 *Wrist extensors*
			5	C7 *Elbow extensors*
			4	C8 *Finger flexors*
			4	T1 *Finger abductors (little finger)*
				T2
				T3
				T4
				T5
				T6
				T7
				T8
				T9
				T10
				T11
				T12
				L1
			5	L2 *Hip flexors*
			5	L3 *Knee extensors*
			5	L4 *Ankle dorsiflexors*
			5	L5 *Long toe extensors*
			5	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 *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)* C1

4. *COMPLETE OR INCOMPLETE?* inc
Incomplete = Any sensory or motor function in S4-5

5. *ASIA IMPAIRMENT SCALE (AIS)* D

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

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

	R	L
SENSORY		
MOTOR		

REV 04/19

Minimum exam items – and I examined two patients like this on the same day!

Classification Accuracy

- Testing algorithm was developed and assessed using 120 full ISNCSCI exams from the EMSCI database
- Accuracy of final algorithm was assessed on an additional 100 cases:
  - **98% accurate for NLI**
  - **100% accurate for AIS**

- *Cause of classification errors:*
  - *For NLI: requires multiple consecutive normal sensory dermatomes caudal to the sensory level, sometimes occurring when right and left sensory levels are asymmetric (not common).*
  - *For AIS: should only happen on a small percentage of cases that have NLI errors (i.e., these will be extremely rare).*

Full ISNCSCI vs. E-ISNCSCI-V2

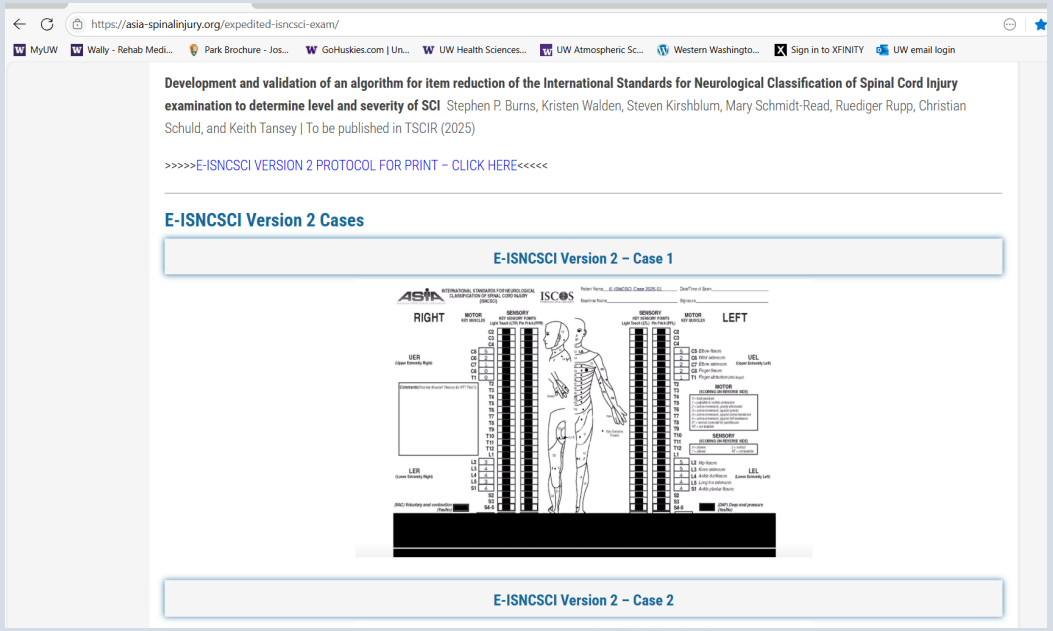
	Full ISNCSCI	E-ISNCSCI-V2
Exam -		
Motor (10 muscles bilaterally)	20 items	20 items
Sensory (28 dermatomes bilat; LT and pin)	112 items	21 items (avg.; 19% of full)
Anorectal exam (for DAP and VAC)	Always	Omit for most AIS C+D
Classifications-		
Neurologic Level of Injury	Y	Y
ASIA Impairment Scale	Y	Y
Motor scores	Y	Y
Sensory scores	Y	N
Motor and sensory levels	Y	N*
Zones of partial preservation	Y	N

*Frequently, the motor and sensory levels can NOT all be determined from what is tested. Assume that that they will NOT BE DETERMINED.

Suggested Uses

Full ISNCSCI	E-ISNCSCI-V2
• Establishing definitive neurologic classifications for acute SCI • Admission to inpatient rehabilitation • Suspected neurological changes with acute or chronic SCI • If classifications other than NLI, AIS, and motor scores are needed • Presence of non-testable exam items, or suspected presence of non-SCI conditions affecting exam findings • Clinical trials (with rare exceptions)	• Quick screening exam for early determination of NLI and AIS • Preliminary evaluation for acute clinical trial eligibility • Periodic monitoring for changes of NLI and AIS during acute care or inpatient rehabilitation • Confirmation of motor exam, NLI, and AIS for patients with chronic SCI and no suspected neurological changes, e.g. during annual evaluations

Training Resources



- ASIA website has the E-ISNSCI-V2 testing protocol:
  - Detailed testing instructions
  - How to record the information
  - Suggested uses
- Website also has 4 case classification examples
- Abstract submitted for an E-ISNCSCI-V2 training workshop for the April 2026 ASIA Conference
- International Standards Committee is developing a plan for creating online training to accompany InSteP
- Praxis and EMSCI online classification calculators are not yet capable of classifying E-ISNCSCI-V2 exams, though it should be possible, and they should be able to also verify that sufficient examination was performed.

https://asia-spinalinjury.org/expedited-isncsci-exam/

Summary

- As of June 2025, our field now has a much shorter exam option for determining NLI and AIS with high classification accuracy
- On average, E-ISNCSCI-V2 requires only 31% of the full 134-item exam:
  - 20 motor exam items (10 muscles x 2)
  - 21 dermatomal sensory light touch or pin exam items (on average)
  - Anorectal exam for about half the cases (omitted for most AIS C and D)
- E-ISNCSCI-V2 should NOT be used:
  - If sensory outcomes are important
  - If classifications other than NLI, AIS, and motor scores are needed

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