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 (LT)	SENSORY KEY SENSORY POINTS Pin Prick (PP)
	C2		2	2
	C3		2	2
	C4		2	2
Elbow flexors	C5	5	2	2
Wrist extensors	C6	5	2	2
Elbow extensors	C7	5	2	2
Finger flexors	C8	5	2	2
Finger abductors (little finger)	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		2	2
	L1		2	2
Hip flexors	L2	2	1	1
Knee extensors	L3	0	1	0
Ankle dorsiflexors	L4	0	0	0
Long toe extensors	L5	0	0	0
Ankle plantar flexors	S1	0	0	0
	S2		0	0
	S3		1	1
	S4-5		1	1
	RIGHT TOTALS	27	44	43
	(MAXIMUM)	*(50)*	*(56)*	*(56)*

UER (Upper Extremity Right)

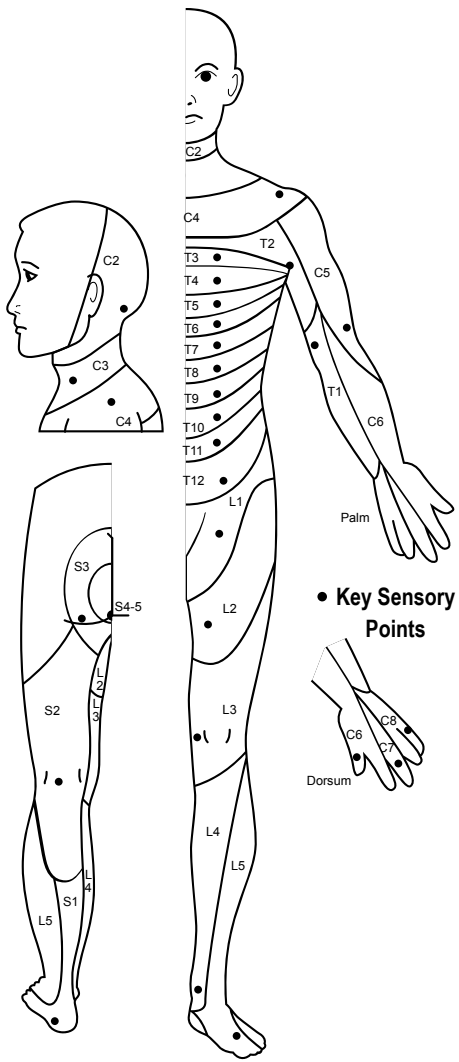
LER (Lower Extremity Right)

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

Edge case 3. Given that I enter all the values for case

14, then the algorighmt calculates the correct results

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



• Key Sensory Points

LEFT

		MOTOR KEY MUSCLES	SENSORY KEY SENSORY POINTS Light Touch (LT)	SENSORY KEY SENSORY POINTS Pin Prick (PP)
	C2		2	2
	C3		2	2
	C4		2	2
Elbow flexors	C5	5	2	2
Wrist extensors	C6	5	2	2
Elbow extensors	C7	5	2	2
Finger flexors	C8	5	2	2
Finger abductors (little finger)	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		2	2
	L1		2	2
Hip flexors	L2	1	2	2
Knee extensors	L3	0	1	1
Ankle dorsiflexors	L4	0	0	0
Long toe extensors	L5	0	0	0
Ankle plantar flexors	S1	0	0	0
	S2		0	0
	S3		1	1
	S4-5		1	2
	LEFT TOTALS	26	45	46
	(MAXIMUM)	*(50)*	*(56)*	*(56)*

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) Yes

MOTOR SUBSCORES

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

LER 2 + **LEL** 1 = ***LEMS TOTAL*** 3 (MAX (25) (25) (50))

SENSORY SUBSCORES

RLT 44 + **LLT** 45 = ***LT TOTAL*** 89 (MAX (56) (56) (112))

RPP 43 + **LPP** 46 = ***PP TOTAL*** 89 (MAX (56) (56) (112))

NEUROLOGICAL LEVELS

Steps 1-5 for classification as on reverse

	R	L
1. SENSORY	L1	L2
2. MOTOR	L1	L1

3. NEUROLOGICAL LEVEL OF INJURY (NLI) L1

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

5. ASIA IMPAIRMENT SCALE (AIS) B

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

	R	L
SENSORY	NA	NA
MOTOR	NA	NA

Clinician signature

REV 02/13

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

5* = (normal) active movement, full ROM against gravity and sufficient resistance to be considered normal if identified inhibiting factors (i.e. pain, disuse) were not present

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 range of motion)

Sensory Grading

0 = Absent

1 = Altered, either decreased/impaired sensation or hypersensitivity

2 = Normal

NT = Not testable

Non Key Muscle Functions (optional)

May be used to assign a motor level to differentiate AIS B vs. C

Movement	Root level
Shoulder: Flexion, extension, abduction, 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 below the neurological level**, and more than half of key muscle functions below the neurological level of injury (NLI) have a muscle grade 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 key muscle functions below the NLI have 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

** For an individual to receive a grade of C or D, i.e. motor incomplete status, they must have either (1) voluntary anal sphincter contraction or (2) sacral sensory sparing with sparing of motor function more than three levels below the motor level for that side of the body. The International Standards at this time allows even non-key muscle function more than 3 levels below the motor level to be used in determining motor incomplete status (AIS B versus C)

NOTE: When assessing the extent of motor sparing below the level for distinguishing between AIS B and C, the ***motor level*** on each side is used; whereas to differentiate between AIS C and D (based on proportion of key muscle functions with strength grade 3 or greater) the ***neurological level of injury*** is used

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** and can record ZPP (lowest dermatome or myotome on each side with some preservation)

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; the ASIA Impairment Scale does not apply