



NEUROLOGICAL ASSESSMENTS

Educational Reference Guide + Workbook for Catastrophic Designation | Ontario

Charles Gluckstein

CERTIFIED AS A SPECIALIST IN CIVIL LITIGATION BY THE LAW SOCIETY OF ONTARIO

Dianne Henderson

Reg.N., B.A. Psych, M.Ed.

MEDICAL-LEGAL CONSULTANT TO GLUCKSTEIN LAWYERS | ONTARIO

Alison O'Callaghan

LAW CLERK, B.A. (Hons.) TO GLUCKSTEIN LAWYERS | ONTARIO



GLUCKSTEIN
PERSONAL INJURY LAWYERS

Introduction

Neurological assessments detect the presence of a neurological disease or injury. The assessments monitor progression, determine the type of care needed, and gauge response to therapeutic interventions. Measuring one's recovery is a very important component for planning future care, determining health care outcomes and securing insurance benefits.

Included in this guide are the assessment tools adopted by the *Insurance Act, RSO 1990* and are required through legislation to be completed by a qualified health care professional to determine access to funding through the *Statutory Accident Benefits Schedule (SABS)*.



Assessments may be carried out for a variety of reasons, such as:

- **Clinical evaluation**, to understand the pattern of cognitive strengths as well as any difficulties one may have, and to aid decision-making for use in a medical or rehabilitation environment.
- **Scientific investigation**, to examine a hypothesis about the structure and function of cognition to be tested, or to provide information that allows experimental testing to be seen in the context of a wider cognitive profile.
- **Medico-legal assessment**, to be used in a court of law as evidence in a legal claim or criminal investigation.

The purpose of this booklet is to help the reader understand neurological assessment tools and to assist the injured person and health care professional through the documentation necessary to secure medical and rehabilitation benefits within the SABS.

Neurological assessments provide assessors with essential information that will help determine whether the injured person is entitled to a catastrophic level of funding through the SABS following a motor vehicle accident (MVA).

By working in collaboration with hospital staff, physicians, the insurance company and the legal team, one will be in the best position to advocate for proper care following a MVA.

Regards,

Handwritten signature of Dianne Henderson in blue ink.

Dianne Henderson, Reg.N., B.A. Psych, M.Ed.

Catastrophic Traumatic Brain Injury Definitions for Auto Accidents Before June 1, 2016

If one has sustained a brain injury before June 1, 2016, in a MVA, the Glasgow Coma Scale (GCS) will be used as a measurement tool for determining catastrophic impairment.

The new Catastrophic (CAT) definition changes and the monetary limit reductions came into effect on June 1, 2016.

The Glasgow Coma Scale (GCS) is used to assess the level of consciousness after a head injury. The GCS is used by: first responders, emergency medical staff, nurses, doctors, and is applicable to all acute medical and trauma patients. The GCS is composed of three tests: eye response, verbal response and motor response.

The three values are considered separately, as well as the sum. The GCS provides a score in the range of 3 to 15; patients with scores between 3 to 8 are usually said to be in a coma. The lowest possible GCS sum is a score of 3 (deep coma or death), while the highest is 15 (fully conscious and responsive).



Glasgow Coma Scale		
Response	Scale	Score
Eye Opening Response	Eyes open spontaneously	4 Points
	Eyes open to verbal command, speech, or shout	3 Points
	Eyes open to pain (not applied to face)	2 Points
	No eye opening	1 Point
Verbal Response	Oriented	5 Points
	Confused conversation, but able to answer questions	4 Points
	Inappropriate responses, words discernible	3 Points
	Incomprehensible sounds or speech	2 Points
	No verbal response	1 Point
Motor Response	Obeys commands for movement	6 Points
	Purposeful movement to painful stimulus	5 Points
	Withdraws from pain	4 Points
	Abnormal (spastic) flexion, decorticate posture	3 Points
	Extensor (rigid) response, decerebrate posture	2 Points
	No motor response	1 Point

SABS Traumatic Brain Injury Automatic CAT Qualification before June 1st, 2016

- (i) a score of 9 or less on the Glasgow Coma Scale according to a test administered within a reasonable period of time after the accident by a person trained for that purpose, or
- (ii) a score of 2 (vegetative) or 3 (severe disability) on the Glasgow Outcome Scale according to a test administered more than six months after the accident by a person trained for that purpose

Introduction to the Glasgow Outcome Scale (GOS)

Effective June 1st, 2016, the Glasgow Coma Scale (GCS) was eliminated as a measuring tool for determining catastrophic impairment related to brain injury and the Glasgow Outcome Scale and the Extended Glasgow Outcome Scale - (GOSE) became the only acceptable measurement tools for brain injured persons 18 years and older at the time of the injury.

Glasgow Outcome Scale (GOS)	
Scale	Description
5 (Good outcome)	Resumption of normal life; there may be minor neurological and/or psychological deficits
4 (Moderately disabled)	Able to work in a sheltered environment and travel by public transportation
3 (Severely disabled)	Dependent for daily support by reason of mental or physical disability or both
2 (Persistent vegetative state)	Unresponsive and speechless for weeks or months or until death
1 (Death)	Not applicable

Glasgow Outcome (GOS): The person who administers the GOS assessment should not have been the one involved in the acute care of the injured person.

Extended Glasgow Outcome Scale (GOSE): Broadens the original 5 GOS categories to 8 by extending severe disability, moderate disability and good recovery into a lower and upper category base. It is used to classify global outcome in brain injury survivors. The GOSE scale is to be used with structured interview questions (see pages 6 & 7) to determine upper or lower levels of disability and improve the reliability of rating.

Extended Glasgow Outcome Scale (GOSE)		
1	Death (D)	D
2	Vegetative State <ul style="list-style-type: none"> • Unable to obey commands or say words • Condition of unawareness with only reflex responses but with periods of spontaneous eye opening 	VS
3	Lower Severe Disability <ul style="list-style-type: none"> • Needs frequent help or supervision most of the time • Dependent for daily support for mental or physical disability, usually a combination of both 	SD –
4	Upper Severe Disability <ul style="list-style-type: none"> • Does not need frequent help, able to be left alone at home for up to eight hours • If the patient can be left alone for more than 8 hours at home it is upper level of SD, if not it is low level of SD – • Not able to shop without assistance • Not able to travel locally without assistance 	SD +
5	Lower Moderate Disability <ul style="list-style-type: none"> • Not able to work, or, only in a sheltered or non-competitive position • Unable to participate in social activities outside the home • Constant and intolerable disruption 	MD –
6	Upper Moderate Disability <ul style="list-style-type: none"> • Patients have some disability such as aphasia, hemiparesis or epilepsy and/or deficits of memory or personality but are able to look after themselves • They are independent at home but dependent outside • If they are able to return to work even with special arrangement, it is upper level of MD, if not then it is lower level of MD – • Participates less in social/leisure activities • Frequent but tolerable disruption 	MD +
7	Lower Good Recovery <ul style="list-style-type: none"> • Participates half as often as before in leisure activities • Occasional disruption • Other problems related to injury (headaches, dizziness, fatigue, memory etc.) affect daily life 	GR –
8	Good Recovery <ul style="list-style-type: none"> • Able to work and to resume social activities to previous capacity • No psychological problems resulting in disruption 	GR +

Extended Glasgow Outcome Scale (GOSE)

Structured Interview

The GOSE questionnaire is to be used in a structured interview to ensure consistency in the overall rating of injured person. Some background knowledge of the injured person is necessary to administer the scale. The areas of the assessment that may involve the exercise of judgment* of the assessor can be summarized into four rules when applying the GOSE.

1. Disability due to head injury is identified by a change from pre-injury status.
2. Only pre-injury status and current status should be considered.
- * Do not consider the initial state after the injury, hopes of future, or the fact that the person has made a remarkable recovery. It is important to establish current capabilities independently of hope for the future progress.
3. Disability must be the result of mental (cognitive/emotional), physical impairment or both resulting from a TBI.
4. The assessor must always consider the best source of information available when making judgment decisions about the injured person (i.e. family members, peers, co-workers)

Scoring: The patient's overall score is based on the **LOWEST** outcome category indication on the scale and must be completed according to regulated timelines to determine Catastrophic (CAT) designation.

For example, if the lowest score on one of the interview questions, at six months, was **SD –** or **"3"**, then that is the GOSE score and the injured person would qualify as CAT.

A written report supporting the decision-making process along with "positive findings on a medically recognized brain diagnostic technology" are needed to meet the CAT criteria designation.

It is important to give a rating to everyone, no matter their current function status. To indicate the existence of preinjury disability, you can put a **"**"** beside the rating. These ratings can then be interpreted as meaning "still disabled at this level" or "disability no worse than this level" and dealt with appropriately in the written report.

Description	Acronym	CAT Designation
Vegetative State	VS	At One Month Post-accident
Lower Severe Disability	SD –	At Six Months Post-accident
Upper Severe Disability	SD +	At Six Months Post-accident
Lower Moderate Disability	MD –	At One Year Post-accident
Upper Moderate Disability	MD +	N/A
Lower Good Recovery	GR –	N/A
Upper Good Recovery	GR +	N/A

SABS Traumatic Brain Injury CAT Qualification post June 1, 2016:

An applicant 18 years of age or older at the time of MVA.

and

The injury shows **positive findings** on a computerized axial tomography scan, a magnetic resonance imaging or any **medically recognized brain diagnostics technology indicating intracranial pathology that is a result of the accident**, including, but not limited to, intracranial contusions or haemorrhages, diffuse axonal injury, cerebral edema, midline shift or pneumocephaly.

and

When assessed in accordance with Structured Interview for the Glasgow Outcome Scale and the Extended Glasgow Outcome Scale: Guidelines for Their Use, the injury results in a rating of,

- **Vegetative State** (VS or VS*), one month or more after the accident,
- **Upper Severe Disability** (Upper SD or Upper SD*) or **Lower Severe Disability** (Upper SD or Lower SD*), six months or more after the accident;

or

- **Lower Moderate Disability** (Lower MD or Lower MD*), one year or more after the accident.

Structured Interview For GOSE

Patient's Name: _____ Interviewer's Name: _____ Date: _____

☐ 0 = Patient alone 1 = Relative/friend/caretaker alone 2 = Patient plus relative/friend/caretaker

Conciousness:

1. Is the head-injured person able to obey simple commands or say any words?

☐ Yes

☐ No (VS)

Note: anyone who shows the ability to obey even simple commands or utter any word or communicate specifically in any other way is no longer considered to be in vegetative state. Eye movements are not reliable evidence of meaningful responsiveness. Corroborate with nursing staff and/or other caretakers. Confirmation of VS requires full assessment.

Independence at home:

2a. Is the assistance of another person at home essential every day for some activities of daily living?

☐ Yes

☐ No (VS) **If no: go to 3**

Note: for a NO answer they should be able to look after themselves at home for 24 hours if necessary, though they need not actually look after themselves. Independence includes the ability to plan for and carry out the following activities: getting washed, putting on clean clothes without prompting, preparing food for themselves, dealing with callers and handling minor domestic crises. The person should be able to carry out activities without needing prompting or reminding and should be capable of being left alone overnight.

2b. Do they need frequent help of someone to be around at home most of the time?

☐ Yes (lower SD)

☐ No (upper SD)

Note: for a NO answer they should be able to look after themselves at home up to eight hours during the day if necessary, though they need not actually look after themselves

2c. Was the patient independent at home before the injury?

☐ Yes

☐ No

Independence outside home:

3a. Are they able to shop without assistance?

☐ Yes

☐ No (upper SD)

Note: this includes being able to plan what to buy, take care of money themselves and behave appropriately in public. They need not normally shop, but must be able to do so.

3b. Were they able to shop without assistance before?

☐ Yes

☐ No

4a. Are they able to travel locally without assistance?

☐ Yes

☐ No (upper SD)

Note: they may drive or use public transport to get around. Ability to use a taxi is sufficient, provided the person can phone for it themselves and instruct the driver.

4b. Were they able to travel locally without assistance before the injury?

☐ Yes

☐ No

Work:

5a. Are they currently able to work (or look after others at home) to their previous capacity?

☐ Yes **If yes, go to 6**

☐ No

5b. How restricted are they?

a. Reduced work capacity?

☐ a. (Upper MD)

b. Able to work only in a sheltered workshop or non-competitive job or currently unable to work?

☐ b. (Lower MD)

Structured Interview For GOSE (continued)

5c. Does the level of restriction represent a change in respect to the pre-trauma situation?

☐ Yes

☐ No

Social and Leisure activities:

6a. Are they able to resume regular social and leisure activities outside home?

☐ Yes **If yes, go to 7**

☐ No

Note: they need not have resumed all their previous leisure activities, but should not be prevented by physical or mental impairment. If they have stopped the majority of activities because of loss of interest or motivation, then this is also considered a disability.

6b. What is the extent of restriction on their social and leisure activities?

a. Participate a bit less: at least half as often as before injury

☐ a. (Lower GR)

b. Participate much less: less than half as often

☐ b. (Upper MD)

c. Unable to participate: rarely, if ever, take part

☐ c. (Lower MD)

6c. Does the extent of restriction in regular social and leisure activities outside the home represent a change in respect to pre-trauma?

☐ Yes

☐ No

Family and friendships:

7a. Has there been family or friendship disruption due to psychological problems?

☐ Yes

☐ No **If no, go to 8**

Note: typical post-traumatic personality changes are: quick temper, irritability, anxiety, insensitivity to others, mood swings, depression and unreasonable or childish behaviour.

7b. What has been the extent of disruption or strain?

a. Occasional - less than weekly

☐ a. (Lower GR)

b. Frequent - once a week or more, but not tolerable

☐ b. (Upper MD)

c. Constant - daily and intolerable

☐ c. (Lower MD)

7c. Does the level of disruption or strain represent a change in respect to pre-trauma situation?

☐ Yes

☐ No

Note: if there were some problems before injury, but these have become markedly worse since the injury then answer yes to question.

Return to normal life:

8a. Are there any other current problems relating to the injury which affect daily life?

☐ Yes (Lower GR)

☐ No (Upper GR)

Note: other typical problems reported after head injury: headaches, dizziness, sensitivity to noise or light, slowness, memory failures and concentration problems.

8b. If similar problems were present before the injury, have these become markedly worse?

☐ Yes

☐ No

9. What is the most important factor in outcome?

☐ a. Effects of head injury

☐ b. Effects of illness or injury to another part of the body

☐ c. A mixture of these

Note: extended GOS grades are shown beside responses on the CRF. The overall rating is based on the lowest outcome category indicated. Areas in which there has been no change with respect to the pre-trauma situation are ignored when the overall rating is made. Rate patient on current function status and indicate the existence of pre-injury disability by putting (*) an asterisk beside the rating. These ratings can be interpreted as meaning "still disabled at this time" and can be dealt with in a narrative report.

King's Outcome Scale for Childhood Head Injury (KOSCHI)

As of June 1st, 2016, if the insured person is under the age of 18 years at the time of the accident and has suffered a traumatic brain injury, they will be considered to be catastrophically impaired if:

- After one month following the accident, the child scores a "2" Vegetative on the KOSCHI; or
- After six months following the accident, the child scores a "3" Severe Disability on the KOSCHI.

KOSCHI Scale Definitions		
Category		Definition
1	Death	
2	Vegetative	Breathes spontaneously; no evidence of verbal or non-verbal communication; no response to commands. May have non-purposeful or reflex movements of limbs or eyes.
3A	Severe Disability	May be fully conscious and be able to communicate but not yet able to carry out any self-care activities such as feeding; requires special educational/rehabilitation setting.
3B	Severe Disability	Limited self-care abilities, predominantly high level of dependency but can assist in some daily activities; may have meaningful communication; requires specialized educational/rehabilitation setting.
4A	Moderate Disability	Mostly independent for daily living, but needs a degree of supervision/help for physical or behavioural problems; has overt problems; may be in special ed/rehab or mainstream school with special needs assistance; behavioural problems may have caused child to be excluded from school.
4B	Moderate Disability	Age appropriately independent for daily living; but neurological sequelae affects daily life including behavioural and learning difficulties; may have frequent headaches; likely to be in mainstream school with/without special needs assistance.
5A	Good Recovery	Appear to have made a full functional recovery, but has residual pathology attributable to TBI; may suffer headaches that do not affect school or social life.
5B	Good Recovery	The information available implies that the child has made complete recovery; no sequelae are identified from head injury.

SABS Traumatic Brain Injury CAT Qualification post June 1st, 2016 includes:

An applicant under 18 years of age at the time of the MVA.

and

The insured person is **accepted for admission, on an in-patient basis, to a public hospital named** in a Superintendent Guideline **with positive findings** on a computerized axial tomography scan, a magnetic resonance imaging or any other **medically recognized brain diagnostic technology indicating intracranial pathology that is a result of the accident**, including, but not limited to, intracranial contusions or hemorrhages, diffuse axonal injury, cerebral edema, midline shift or pneumocephaly;

or

The insured person is **accepted for admission, on an in-patient basis, to a program of neurological rehabilitation in a paediatric rehabilitation facility** that is a member of the Ontario Association of Children's Rehabilitation Services;

or

One month or more after the accident, the insured person's level of neurological function does not exceed category 2 (Vegetative) on the KOSCHI;

or

Six months or more after the accident, the insured person's level of neurological function does not exceed category 3 (Severe disability) on the KOSCHI;

or

Nine months or more after the accident, the insured's person's level of function remains seriously impaired such that the insured person is **not age-appropriate independent and requires in-person supervision or assistance for physical, cognitive or behavioural impairments** for the majority of the insured person's waking day.

Additional Neurological Catastrophic Impairment Designations

As of June 1st, 2016, Catastrophic Impairment Designation for Paraplegia or Tetraplegia rely on the ASIA Impairment Scale, as published in Marino, R. J. et al, **International Standards for Neurological Classification of Spinal Cord Injury**.

The ASIA Impairment Scale for spinal cord injury has five ratings from "A", which is complete loss of motor or sensory function, to "E", which is normal motor and sensory function. An injured person with an ASIA impairment scale rating of A, B, or C is automatically considered catastrophic. A person will be considered CAT, if they rate D on the ASIA Impairment Scale and meet 2 of the 3 stipulations listed below in SABS CAT Qualifications.

The Spinal Cord Independence Measure III (SCIM) is a disability scale developed specifically for the Spinal Cord Injury (SCI) population to assess various activities of daily living (ADL). It is designed for monitoring the injured person's functioning progress, directing and prioritizing therapeutic interventions and assisting with identifying the patient's equipment and care needs in preparation for discharge. The SCIM III is not in this booklet, but the full 24 page assessment can be located on the Rick Hanson website.

ASIA IMPAIRMENT SCALE
<input type="checkbox"/> A = Complete: No motor or sensory function is preserved in sacral segments S4 - S5.
<input type="checkbox"/> B = Sensory Incomplete: Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-S5.
<input type="checkbox"/> C = Motor Incomplete: Motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a muscle grade less than 3.
<input type="checkbox"/> D = Motor Incomplete: Motor function is preserved below the neurological level, and at least half of key muscles below the neurological level have a muscle grade of 3 or more.
<input type="checkbox"/> E = Normal: Motor and sensory functions are normal.



Additional Automatic SABS CAT Qualification for auto accidents before June 1, 2016.

1. Paraplegia or Quadriplegia;
2. If the accident occurred on or after September 1, 2010, the amputation of an arm or leg or another impairment causing the total and permanent loss of use of an arm or leg.

Auto accidents after June 1, 2016:

1. Paraplegia or Tetraplegia:

The insured person's permanent grade on the ASIA Impairment Scale is or will be, A, B, or C, or D, and

- the insured person's score on the **Spinal Independence Measure, Version III**, item 12 (Mobility Indoors), and applied over a distance of up to 10 metres on an even indoor surface is **0 to 5**,
 - the insured person requires **urological surgical diversion**, an implanted device, or intermittent or constant catheterization in order to manage a residual neuro-urological impairment, or
 - the insured person has **impaired voluntary control over anorectal function** that requires a bowel routine, a surgical diversion or an implanted device.
2. **Amputation** of an arm or another impairment causing the total and permanent loss of use of an arm.
 3. **Severe and permanent alteration of prior structure and function involving one or both legs** as a result of which the insured person's score on the **Spinal Cord Independence Measure, Version III**, item 12 (Mobility Indoors), and applied over a distance of up to 10 metres on an even indoor surface is **0 to 5**.

RIGHT

MOTOR

KEY MUSCLES

SENSOR

KEY SENSOR POINTS

Light Touch (LTR)

Pin Prick (PPR)

UER

(Upper Extremity Right)

C5 Elbow flexors

C6 Wrist extensors

C7 Elbow extensors

C8 Finger flexors

T1 Finger abductors (little finger)

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

LER

(Lower Extremity Right)

L2 Hip flexors

L3 Knee extensors

L4 Ankle dorsiflexors

L5 Long toe extensors

S1 Ankle plantar flexors

UUR

(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 dorsiflexors

L5 Long toe extensors

S1 Ankle plantar flexors

RIGHT TOTALS

(MAXIMUM)

(50)

MOTOR SUBSCORES

UER + UEL = UEMS TOTAL

MAX (25)

LER + LEL = LEMS TOTAL

MAX (25)

UUR + ULR = UEMS TOTAL

MAX (25)

LEL + LEL = LEMS TOTAL

MAX (25)

UUR + ULR + LER + LEL = PP TOTAL

MAX (100)

LEFT

MOTOR

KEY MUSCLES

SENSOR

KEY SENSOR POINTS

Light Touch (LTR)

Pin Prick (PPL)

UEL

(Upper Extremity Left)

C5 Elbow flexors

C6 Wrist extensors

C7 Elbow extensors

C8 Finger flexors

T1 Finger abductors (little finger)

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

LEL

(Lower Extremity Left)

L2 Hip flexors

L3 Knee extensors

L4 Ankle dorsiflexors

L5 Long toe extensors

S1 Ankle plantar flexors

LEFT TOTALS

(MAXIMUM)

(50)

MOTOR SUBSCORES

UER + UEL = UEMS TOTAL

MAX (25)

LER + LEL = LEMS TOTAL

MAX (25)

UUR + ULR = UEMS TOTAL

MAX (25)

LEL + LEL = LEMS TOTAL

MAX (25)

UUR + ULR + LER + LEL = PP TOTAL

MAX (100)

NEUROLOGICAL LEVELS

Steps 1-5 for classification as on reverse

1. SENSORY

2. MOTOR

3. NEUROLOGICAL LEVEL OF INJURY (NLI)

4. COMPLETE OR INCOMPLETE? (In complete injuries only)

5. ASIA IMPAIRMENT SCALE (AIS)

Most caudal level with any innervation

ASIA

ISCS

This form may be copied freely but should not be altered without permission from the American Spinal Injury Association.

REV 11/15

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 ROM)

Sensory Grading

- 0 = Absent
- 1 = Altered, either decreased/impaired sensation or hypersensitivity
- 2 = Normal
- NT = Not testable

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

- Shoulder: Flexion, extension, abduction, adduction, internal and external rotation
- Elbow: Supination
- Elbow: Pronation
- Wrist: Flexion
- Finger: Flexion at proximal joint, extension.
- Thumb: Flexion, extension and abduction in plane of thumb
- Finger: Flexion at MCP joint
- Thumb: Opposition, adduction and abduction perpendicular to palm
- Finger: Abduction of the index finger
- Hip: Adduction
- Hip: External rotation
- Hip: Extension, abduction, internal rotation
- Knee: Flexion
- Ankle: Inversion and eversion
- Toe: MP and IP extension
- Hallux and Toe: DIP and PIP flexion and abduction
- Hallux: Adduction

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-S5) 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.



INTERNATIONAL STANDARDS FOR NEUROLOGICAL CLASSIFICATION OF SPINAL CORD INJURY



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 anigravity (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=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)

NO

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

YES

NO

AIS=C

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.

NEUROLOGICAL ASSESSMENTS

Educational Reference Guide + Workbook for Catastrophic Designation | Ontario

Although the author and publisher have made every effort to ensure that the information in this book was correct at press time, the author and publisher do not assume and hereby disclaim any liability to any party for any loss, damage, or disruption caused by errors or omissions, whether such errors or omissions result from negligence, accident, or any other cause.

This booklet provides general information, not legal advice.

For legal advice about your own situation, contact a lawyer.

©2018, Dianne Henderson, Reg.N., B.A. Psych, M.Ed.

MEDICAL-LEGAL CONSULTANT,

GLUCKSTEIN PERSONAL INJURY LAWYERS P.C., TORONTO, CANADA

NO REPRODUCTION, COPYING, MODIFICATION OR TRANSMISSION OF THIS PUBLICATION, IN WHOLE OR PART, MAY BE MADE WITHOUT THE PRIOR WRITTEN PERMISSION OF DIANNE HENDERSON.

For additional copies or comments, please contact:

Dianne Henderson

henderson@gluckstein.com

or

Alison O'Callaghan

ocallaghan@gluckstein.com

1.866.308.7722

www.gluckstein.com



GLUCKSTEIN
PERSONAL INJURY LAWYERS