

**I VISUAL FUNCTIONS****Visual Fields**

- 0 normal
- 1 signs only: patient unaware of deficit
- 2 moderate: patient aware but incomplete hemianopsia on exam
- 3 marked: complete homonymous hemianopsia or equivalent

**Scotoma**

- 0 none
- 1 small: patient unaware but detectable on confrontation testing
- 2 large: spontaneously reported by patient

**Red Desaturation**

- 0 not present
- 1 present

**FUNCTIONAL SYSTEM SCORE:**

- 0 normal
- 1 visual acuity (corrected) worse eye worse than 20/20 but better than 20/30 OR small scotoma
- 2 worse eye 20/30 to 20/59
- 3 worse eye 20/60 to 20/99 OR large scotoma OR moderate decrease in fields
- 4 worse eye 20/100 to 20/200 OR marked decrease in fields
- 5 worse eye corrected acuity worse than 20/200 OR grade 4 plus better eye 20/60 or less
- 6 grade 5 plus better eye 20/60 or less

**II BRAINSTEM FUNCTIONS:****Extraocular Movement Impairment:**

- 0 none
- 1 signs only: subtle, barely detectable on exam; patient without blurred vision or diplopia
- 2 mild: grade 1 plus patient aware OR obvious incomplete paralysis of eye movement but patient not aware
- 3 moderate: obvious incomplete paralysis and patient aware OR complete loss of movement in one direction
- 4 marked: complete loss of movement in more than one direction

**Nystagmus:**

- 0 none
- 1 mild: gaze evoked, subtle
- 2 moderate: sustained on horizontal or vertical gaze but not in primary position
- 3 severe: sustained in primary position OR coarse direction that interferes with acuity OR complete internuclear ophthalmoplegia OR oscillopsia

**Trigeminal Impairment:**

- 0 none
- 1 signs only
- 2 mild: detectable on exam and patient aware
- 3 moderate: impaired sharp/dull in any trigeminal branch OR one episode of trigeminal neuralgia in last 24 hours
- 4 marked: loss of sharp/dull OR complete loss of sensation of one trigeminal nerve

**Facial Weakness:**

- 0 none
- 1 signs only
- 2 mild: detectable on exam AND patient aware
- 3 moderate: incomplete
- 4 marked: complete unilateral

**Hearing Loss:**

- 0 none
- 1 signs only: hears finger rub less on one or both sides but no complaint of loss
- 2 mild: grade 1 but patient aware
- 3 moderate: does not hear finger rub on one or both sides
- 4 marked: misses whispered numbers

**Dysarthria:**

- 0 none
- 1 signs only
- 2 mild: detectable AND patient aware
- 3 moderate: obvious AND impairs comprehension
- 4 marked: incomprehensible
- 5 mute

**Dysphagia:**

- 0 none
- 1 signs only
- 2 mild: difficulty with thin liquids
- 3 moderate: difficulty with liquids and solids
- 4 marked: sustained difficulty AND requires pureed diet
- 5 inability to swallow

**Other Cranial Nerve Functions:**

- 0 normal
- 1 signs only
- 2 mild: detectable on exam and patient aware
- 3 moderate disability
- 4 marked disability

**FUNCTIONAL SYSTEM SCORE:**

- 0 normal
- 1 signs only
- 2 moderate nystagmus and/or moderate loss EOM and/or mild other
- 3 severe nystagmus and/or marked loss EOM and/or moderate other
- 4 marked dysarthria and/or marked other
- 5 inability to swallow or speak

**III PYRAMIDAL FUNCTIONS****General Guidance:**

- a. Weakest muscle in each group defines the score of the muscle group
- b. When possible use of functional tests (hopping on 1 foot and walking on heels/toes) is highly recommended
- c. BMRC Rating Scale for individual muscle testing:
  - 0 no muscle contraction
  - 1 visible contraction but no movement
  - 2 movement only in plane of gravity
  - 3 movement against gravity but not resistance
  - 4 movement against resistance but not full strength
  - 5 normal strength

**A. UPPER EXTREMITIES:****Pronator Drift:**

- 0 none
- 1 mild
- 2 marked

**Rapid Tapping** (thumb to forefinger)

- 0 normal ( > 16 / seconds OR too many to count
- 1 mild decrease ( 10-15 / 5 seconds )
- 2 moderate decrease ( 5-9 / 5 seconds )
- 3 marked decrease (less than 5 taps in 5 seconds

**Repetitive lifting of 5-lb weight:**

R L

- Deltoids
- Biceps
- Triceps
- Wrist extensors
- Wrist flexors

**B. LOWER EXTREMITIES:****Rapid Tapping** (ball of foot tapping on floor with heel stationary on floor)

- 0 normal ( > 16 / seconds OR too many to count
- 1 mild decrease ( 10-15 / 5 seconds )
- 2 moderate decrease ( 5-9 / 5 seconds )
- 3 marked decrease (less than 5 taps in 5 seconds)

**Lower extremity individual muscle strength:**

- Repetitive, unilateral: R L
  - Up on ball of foot
  - Up on heel of foot
  - Partial deep knee bends

**Leg sinking** (ability to lay flat, knees fully extended and hold both legs together) :

- 0 none
- 1 mild
- 2 marked

**Walking on heels/toes:**

- 0 normal
- 1 impaired
- 2 not possible

**Hopping on one foot:**

- 0 11 or more times
- 1 6 – 10 times
- 2 1 – 5 times
- 3 not possible

**Gait spasticity:**

- 0 none
- 1 barely perceptible
- 2 minor interference with function
- 3 permanent shuffling; major interference with function

**Overall Motor Performance:**

- 0 normal
- 1 abnormal weakness compared to peers in demanding tasks but no demonstrable weakness on individual muscle testing (above)
- 2 decreased strength on individual muscle testing (above)

**FUNCTIONAL SYSTEM SCORE:**

- 0 normal
- 1 abnormal signs without disability
- 2 BMRC grade 4 in 1 or 2 muscle groups

- 3 grade 4 in > 2 muscle groups OR grade 3 in 1 or 2 muscle groups OR grade 2 or less in 1 muscle group
- 4 grade 2 in two limbs OR grade 0 or 1 in one limb
- 5 grade 0 or 1 in all groups both legs OR grade 2 or less in 3 limbs OR hemiplegia
- 6 tetraplegia: grade 0 or 1 in all groups of all four limbs

#### IV CEREBELLAR FUNCTIONS:

##### Head tremor:

- 0 none
- 1 mild
- 2 moderate
- 3 severe

##### Truncal Ataxia:

- 0 none
- 1 signs only
- 2 mild: swaying with eyes closed
- 3 moderate: swaying with eyes open
- 4 severe: unable to sit without assistance

##### Limb Ataxia (tremor/dysmetria/rapid alternating movements):

- 0 none
- 1 signs only
- 2 mild: tremor or clumsy movements easily seen; minor function interference
- 3 moderate: tremor or clumsy movements interfere with all functions
- 4 severe: most functions are very difficult

##### Tandem Walking ("tight rope"):

- 0 normal
- 1 impaired
- 2 not possible

##### Gait Ataxia:

- 0 none
- 1 signs only
- 2 mild: imbalance realized by patient and/or significant other
- 3 moderate: imbalance with ordinary walking
- 4 severe: unable to walk > few steps OR requires walking aid

##### Romberg:

- 0 normal
- 1 mild instability with eyes closed
- 2 not stable with eyes closed
- 3 not stable with eyes open

**FUNCTIONAL SYSTEM SCORE:**

- 0 normal
- 1 abnormal signs without disability
- 2 mild ataxia and/or moderate Romberg and/or tandem walking not possible
- 3 moderate limb ataxia and/or moderate or severe gait/truncal ataxia
- 4 severe gait/truncal ataxia AND severe ataxia in 3 or 4 limbs
- 5 unable to perform coordinated movements due to ataxia
- X pyramidal weakness grade 3 or worse OR sensory deficits interfere with cerebellar testing

**V SENSORY FUNCTIONS****Superficial sensation** (light touch and pin):

- 0 normal
- 1 signs only:
- 2 mild: slightly decreased on exam of which patient was not aware
- 3 moderate: impaired discrimination of sharp/dull
- 4 marked: unable to discriminate sharp/dull OR unable to feel light touch
- 5 complete loss of all sensation

**Vibration** (at most distal joint of forefinger and of great toe):

- 0 normal
- 1 mild decrease
- 2 marked decrease
- 3 complete loss of vibration

**L'Hermitte's Sign:** [does not contribute to Sensory FS score]

- 0 negative
- 1 positive

**Paresthesias** (tingling) [does not contribute to Sensory FS score]

- 0 none
- 1 present

**FUNCTIONAL SYSTEM SCORE:**

- 0 normal
- 1 mild vibration or light touch or pin decrease only in 1 or 2 limbs
- 2 mild decrease of light touch or pin AND/OR moderate decrease of vibration in 1 or 2 limbs OR mild decrease of vibration or pin in more than 2 limbs
- 3 moderate decrease in light touch or pin OR marked decrease vibration in 1 or 2 limbs AND/OR mild decrease in light touch or pin in more than 2 limbs
- 4 marked decrease of light touch or pin in 1 or 2 limbs
- 5 loss of all sensation in 1 or 2 limbs OR moderate decrease of light touch or pin for most of the body below the head
- 6 complete loss of sensation below head

**VI BOWEL/BLADDER FUNCTIONS:****Urinary hesitancy and retention:**

- 0 none
- 1 mild: no impact on lifestyle
- 2 moderate: urinary retention; frequent urinary tract infections
- 3 severe: requires catheterization
- 4 loss of function: overflow incontinence

**Urinary urgency and incontinence:**

- 0 none
- 1 mild: no impact on lifestyle
- 2 moderate: incontinence once a week or less; must wear pads
- 3 severe: more frequent incontinence; must wear pads
- 4 complete loss of bladder control

**Bladder catheterization:**

- 0 none
- 1 intermittent self-cath
- 2 indwelling cath

**Bowel Dysfunction:**

- 0 none
- 1 mild: mild constipation, no incontinence, no major impact on lifestyle
- 2 moderate: must wear pads or be near lavatory; impacts lifestyle
- 3 severe: needs enema or manual disimpaction
- 4 complete loss of function

**FUNCTIONAL SYSTEM SCORE:**

- 0 normal
- 1 mild urinary hesitancy, urgency and/or constipation
- 2 moderate urinary hesitancy/retention and/or moderate urinary urgency/incontinence and/or moderate bowel dysfunction
- 3 frequent urinary incontinence or intermittent self-cath or needs enema/manual disimpaction
- 4 almost constant catheterization
- 5 loss of either bladder or bowel function
- 6 loss of both bladder and bowel function

**VII CEREBRAL FUNCTIONS:****Depression or euphoria:**

- 0 none
- 1 present: complained of by patient or noted by significant other or investigator

**Decrease in mentation:**

- 0 none
- 1 signs only, not apparent to patient or significant other
- 2 mild but can handle everyday activities
- 3 moderate: abnormalities on brief MSE but fully oriented
- 4 marked: disoriented in 1 or 2 spheres; marked effect on lifestyle
- 5 confusion and complete disorientation

**Fatigue:**

- 0 none
- 1 mild: not interfering with daily activities
- 2 moderate: interferes with < 50% of daily activities
- 3 severe: interferes with >50% of daily activities

**FUNCTIONAL SYSTEM SCORE:**

- 0 normal
- 1 signs only (mild decrease in mentation or mild fatigue)
- 2 mild decrease in mentation; moderate or severe fatigue
- 3 moderate decrease in mentation
- 4 marked decrease in mentation
- 5 dementia