Assessment Of The Central Nervous System

History Of Present Illness And Review Of System

General
The following characteristics of each symptom should be elicited and explored:
• Onset (sudden or gradual)
• Chronology
• Current situation (improving or deteriorating)
• Location
• Radiation
• Quality
• Timing (frequency, duration)
• Severity
• Precipitating and aggravating factors
• Relieving factors
• Associated symptoms
• Effects on daily activities
• Previous diagnosis of similar episodes
• Previous treatments
• Efficacy of previous treatments

Cardinal Symptoms
In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited, as follows.

General Cerebral Function
• Changes in memory, especially recent
• Changes in concentration
• Changes in mood

Cranial Nerve Function
• Changes in vision, drooping eyelids
• Facial weakness
• Disturbance of speech production
• Hearing loss, unusual noise in ears, difficulties with balance
• Impairment of sense of smell or taste

Headaches
• Onset, age at onset
• Pattern, any changes in pattern, how it progresses
• Location, description, whether pulsating, degree of pain
• Time of day, duration, frequency

• Precipitating factors, aggravating factors
• Associated symptoms: nausea, vomiting, visual or sensory disturbances
• Interference with daily activities

Changes in Level of Consciousness
• Dizziness
• Fainting
• Convulsions
• History of head injury that produced any loss of consciousness

Motor Function
• Muscle weakness, paralysis, stiffness, spasm
• Clumsiness, ataxia
• Staggering gait with wide-base stance
• Tremor

Sensory Function
• Loss of or decrease in sensation
• Sensation of "pins and needles," tingling
• Burning sensation

Other Associated Symptoms
• Bowel or bladder dysfunction
• Impotence
• Pain

Medical History (Specific To Central Nervous System)
• Seizures
• Head trauma
• Metabolic disorders (e.g. diabetes mellitus, thyroid problems)
• Cardiac disorders (e.g. hypertension, heart block)
• Transient ischemic attack
• Demyelinating disorders (e.g. multiple sclerosis, Parkinson's disease)
• Alcoholism
• Migraine headaches
• Psychiatric disorders (e.g. depression, bipolar disorder)
• Bell's palsy
Family History (Specific To Central Nervous System)

- Seizures
- Metabolic disorders (e.g. diabetes mellitus)
- Cardiac disorders (e.g. hypertension, myocardial infarction, stroke)
- Demyelinating disorders (e.g. multiple sclerosis, Parkinson's disease)
- Headaches (including types)
- Psychiatric disorders

Personal And Social History (Specific To Central Nervous System)

- Alcoholism and/or drug abuse
- Occupational exposure to neurotoxins
Examination Of The Central Nervous System

General Appearance
• Apparent state of health
• Appearance of comfort or distress
• Colour (e.g. flushed, pale, cyanotic)
• Nutritional status (emaciated or obese)
• Match between appearance and stated age

To Be Assessed During History-Taking
• Level of consciousness
• Mental status
• Speech (clarity, content, volume, rate)

Screening Examination
The following screening examination will reveal areas of difficulties. If deficits are discovered, a more in-depth examination is required.

Cranial Nerves
See Table 1.

Table 1: Screening tests for cranial nerves

<table>
<thead>
<tr>
<th>Cranial Nerve</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Olfactory</td>
<td>Smell (test only if there is a specific complaint)</td>
</tr>
<tr>
<td>II Optic</td>
<td>Visual acuity, visual fields, funduscopic examination</td>
</tr>
<tr>
<td>III Oculomotor</td>
<td>Pupillary response (direct or consensual)</td>
</tr>
<tr>
<td>IV Trochlear</td>
<td>Extraocular eye movements</td>
</tr>
<tr>
<td>VI Abducent</td>
<td>Motor function: clench teeth, open jaw.</td>
</tr>
<tr>
<td>V Trigeminal</td>
<td>Sensory function: pain (sharp stimulus); light touch (cotton wisp); sensation on forehead, cheek, chin. Corneal reflex (omit if client is conscious)</td>
</tr>
<tr>
<td>VII Facial</td>
<td>Facial symmetry; raise eyebrows, frown, close eyes tightly against resistance, show teeth, puff cheeks, smile</td>
</tr>
<tr>
<td>VIII Acoustic</td>
<td>Hearing (watch ticking, whisper), Rinne and Weber tests</td>
</tr>
<tr>
<td>IX Glossopharyngeal</td>
<td>Movement of palate, uvula, pharyngeal wall. Gag reflex and swallowing.</td>
</tr>
<tr>
<td>X Vagus</td>
<td>Hoarseness</td>
</tr>
<tr>
<td>XI Spinal accessory</td>
<td>Shoulder shrug against resistance. Head turn against resistance</td>
</tr>
<tr>
<td>XII Hypoglossal</td>
<td>Stick out tongue, push tongue against each cheek</td>
</tr>
</tbody>
</table>

Motor Function, Sensory Function and Reflexes
Assess motor function, sensory function and reflexes together, as follows.
### Table 2: Glasgow Coma Score

<table>
<thead>
<tr>
<th>Eye Opening (E)</th>
<th>Verbal Response (V)</th>
<th>Motor Response (M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4=Spontaneous</td>
<td>5=Normal conversation</td>
<td>6=Normal</td>
</tr>
<tr>
<td>3=To voice</td>
<td>4=Disoriented conversation</td>
<td>5=Localizes to pain</td>
</tr>
<tr>
<td>2=To pain</td>
<td>3=Words, but not coherent</td>
<td>4=Withdraws to pain</td>
</tr>
<tr>
<td>1=None</td>
<td>2=No words...only sounds</td>
<td>3=Decorticate posture</td>
</tr>
<tr>
<td></td>
<td>1=None</td>
<td>2=Decerebrate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1=None</td>
</tr>
</tbody>
</table>

Total = E + V + M

Note that the phrase 'GCS of 11' is essentially meaningless, and it is important to break the figure down into its components, such as E3V3M5 = GCS 11.

A Coma Score of 13 or higher correlates with a mild brain injury, 9 to 12 is a moderate injury and 8 or less a severe brain injury.


### Arms and Hands
- Grip strength
- Raise both arms and hold (assess for palmar drift)
- Finger-nose test (assess for eye-hand coordination)
- Blunt and sharp pin prick
- Reflexes (biceps, triceps, brachioradialis [supinator])

### Legs
- Straight-leg raising
- Bowstring test
- Quadriceps test
- Heel-to-toe walk
- Heel-shin test
- Romberg test
- Blunt and sharp pin prick
- Reflexes (Achilles’ tendon, patellar, plantar)

### Meningeal Irritation
Test for meningeal irritation if indicated:
- Neck stiffness
- Brudzinski's sign
- Kernig's sign