

# Neurological Evaluation: An Introduction

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## Outline

- Introduction
- General Neurological Examination
- Modified Rankin Scale and Barthel Index

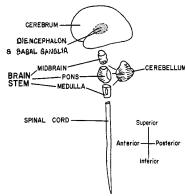
## Nervous System

### Central Nervous System (CNS)

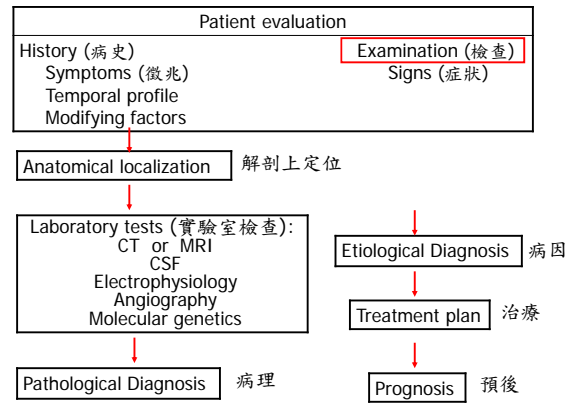
1. Brain: aphasia, stroke, brain tumor, movement disorder (chorea), Alzheimer's disease (dementia), Parkinson's disease, epilepsy, ...
2. Brainstem or cerebellum
3. Spinal Cord

### Peripheral Nervous System (PNS)

Muscle and nerves



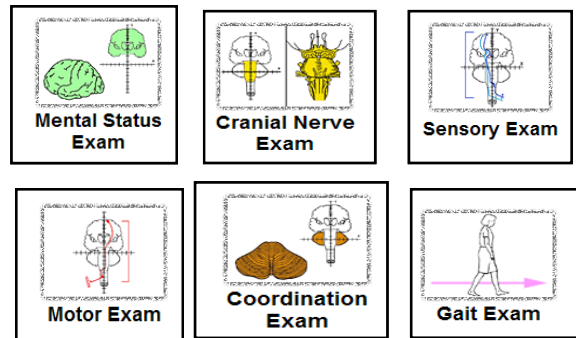
## Clinical Approach to Neurological Disease



## Neurological Examination: An Introduction

- General examination
- Specific examination

## Neurological Examination



## Consciousness & Mentality

- JOMAC:
  - Judgment
  - Orientation: time, place and person
  - Memory: Recent memory
  - Abstract thinking
  - Calculation
- Level of Consciousness
  - Alert
  - Confusion
  - Stupor
  - Coma

## High Cortical Function

- 左腦(優勢半球): 語言
- 右腦: 視覺、立體感覺 → 半邊忽略
- 失語症
- 失用症
- 人格異常
- JOMAC:
  - Judgement
  - Orientation
  - Memory
  - Abstract thinking
  - Calculation

## Cranial Nerves ( I )

- Olfactory nerve (I)
- Optic nerve (II):
  - Pupil size
  - Light reflex
  - Visual acuity
  - Visual field: confrontation test

## Cranial Nerves ( II )

- Extra-Ocular Muscles:
  - Oculomotor nerve (III)
  - Trochlear nerve (IV)
  - Abducens nerve (VI)
- Trigeminal Nerve (V):
  - Three divisions
  - Motor: masseter, temporalis

## Cranial Nerves ( III )

- Facial Nerve (VII):
  - Motor –
    - Facial expression
    - Naso-labial fold
    - Eye blinking
    - Wrinkles
  - Sound damping, taste
  - Central vs peripheral facial palsy

## Cranial Nerves ( IV )

- Vestibulo-Cochlear Nerve (VIII)
  - Doll eye sign
- Glossopharyngeal (IX) & Vagus (X) Nerves
  - Taste
  - Voice
  - Gag reflex

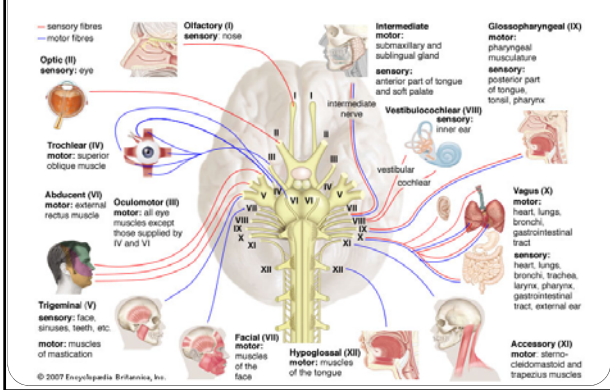
### Cranial Nerves ( V )

- Spinoaccessory Nerve (XI):
  - Trapezius muscles
  - Sternocleidomastoid muscles
- Hypoglossal Nerve (XII):
  - Tongue atrophy
  - Fasciculation
  - Deviation
  - Strength

### Cranial Reflex

- Light reflex (II-III)
- Corneal reflex (V-VII)
- Doll eye sign (VIII)
- Gag reflex (IX, X)

### Cranial Nerve: Summary



### Motor System

- Muscle tone and status
- MRC system for Muscle power
- Screening test:
  - Pronator test
  - Hand grip
  - Squatting

### MRC System

- 5 normal power
- 4 against resistance : 4+, 4, 4-
- 3 against gravity
- 2 horizontal movement (no anti-gravity)
- 1 flicker
- 0 no movement

### Coordination

- Cerebellar dysmetria:
  - Finger-nose-finger test
  - Heel-to-shin test
- Rapid alternating movement (RAM)
- Muscle tone: hypotonia
- Gait: ataxia

## Tendon Reflex

- 0 absent
- ± present only with reinforcement
- 1+ present but depressed
- 2+ normal
- 3+ increased
- 4+ clonus

## Sensory Examination

- Pinprick
- Thermal
- Touch
- Position
- Vibration

## Modified Rankin Scale (mRS)

The qualifying stroke will be classified by the modified Rankin scale. Classification of the qualifying stroke will be done after the patient is considered neurologically and clinically stable. This scale provides an assessment of the degree of disability. Minor strokes are considered Grades 0 to 2, while major strokes are Grades 3 to 5.

### Modified Rankin Scale

- Grade 0: no symptoms at all
- Grade 1: no significant disability despite symptoms: able to carry out usual duties and activities
- Grade 2: slight disability: unable to carry out all previous activities but able to look after own affairs without assistance
- Grade 3: moderate disability: requiring some help, but able to walk without assistance
- Grade 4: moderate / severe disability: unable to walk without assistance, and unable to attend to own bodily needs without assistance
- Grade 5: severe disability: bedridden, incontinent, and requiring constant nursing care and attention

## Barthel Index (Scale for ADL)

Table 2.3.2 Barthel Index (Mahoney and Barthel, 7)		
Evaluation	Score	
1 Feeding	• totally dependent	0
	• needs help	5
	• independent	10
2 Bathing	• cannot perform without assistance	0
	• performs without assistance	5
3 Grooming	• needs assistance	0
	• washes face, combs hair, brushes teeth	5
	• totally independent	10
4 Dressing	• needs help for shoes at least half of time, without restriction	0
	• independent: ties shoes, fastens buttons, applies braces	5
	• independent	10
5 Lower extremities	• frequent accidents	0
	• occasional accidents or needs help with stairs or transfers	5
	• no accidents, able to use stairs or substation if needed	10
6 Transfer	• movement or needs wheeling platform	0
	• occasional accidents or needs help with descent	5
	• no accidents, able to care for collecting device if used	10
7 Toilet transfers	• no use of toilet, bedpan	0
	• needs help for diaper, washing clothes, or toilet paper	5
	• independent with toilet or bedpan	10
8 Upper extremities/transfers	• completely dependent: use of arm not possible	0
	• able to do full range motion assistance to transfer	5
	• independent: assistance or supervision	10
9 Ambulation/mobility	• independent, including ticks of wheelchair and lifting	15
	• sits on wheelchair but cannot wheel self	0
	• independent with assistance 10 yards only if unable to walk	5
10	• ambulatory with help for 10 yards	10
	• independent for 10 yards, may use assistive devices, except for crutch/walker	15
	• cannot climb stairs	0
11 stair-climbing	• independent with help	5
	• independent	10
	• ambulatory devices	15
www total		100

## Glasgow Outcome Scale

- 1: **Good recovery:** patient can lead a full and independent life with or without minimal neurological deficit
- 2: **Moderately disabled:** patient has neurological or intellectual impairment but is independent
- 3: **Severely disabled:** patient conscious but totally dependent on others to get through daily activities
- 4: **Vegetative**
- 5: **dead**

*Thank You  
for Your  
Attention*

