Clinical Approach to Neurologic Disorders

**GENERAL SYMPTOMS AND SIGNS**
- Anatomic
- Pathophysiological
- Phenomenologic

**TREATMENT**
- Symptomatic
- Protective
- Curative
- Surgical

Surgical Approaches

- **Ablative**
  - Thalamotomy
  - Pallidotomy

- **Electrical stimulation (DBS)**
  - VIM thalamus, globus pallidus internus, sub-thalamic nucleus

- **Transplant**
  - Autologous adrenal, human fetal, xenotransplants, genetically engineered transplants

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**Medtronic DBS system**

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### Disease Classification

- Congenital
- Genetic
- Demyelinating
- Vascular
- Immunologic
- Neoplastic/Paraneoplastic
- Toxic/Nutritive
- Metabolic
- Mitochondrial/Sub-cellular systems
- Infectious/Post-infectious
- Traumatic
- Degenerative
- Idiopathic
- Iatrogenic

### Physical Exam

#### General medical
Brief comments on relevant pulmonary, cardiovascular examiners, findings, musculoskeletal deformities, asymmetric and skin (rashes, other markings)

#### Physical Exam

**Neurologic**

- **Motor exam**
  - Strength: e.g. MRC 5/5 point scale
  - Muscle mass
  - Tone
  - Reflexes: deep tendon (can be elicited in the jaw), cutaneous (Babinski), abdominal
  - Rapid alternating movements
    - speed, decrement rhythm
  - Involuntary movements
    - tremor
    - myoclonus
    - chorea
    - athetosis
    - dyskinesia
    - ballismus
  - Motor apraxias
    - dressing, combing hair, brushing teeth

- **Sensory exam**
  - Cranial divisions of V
  - Other head and neck
    - Angle of jaw
    - Nerve or root
  - Primary modalities
    - Light touch
    - Two point discrimination
    - Pain
    - Vibration
    - Position sense
  - Higher cortical modalities
    - Graphesthesia
    - Stereognosia

- **Coordination**
  - Usually, but not always, tests for cerebellar dysfunction
  - Targeted voluntary movements
    - finger-to-nose
    - heel-to-shin
  - Rapid alternating movements: fine hand, finger control

- **Gait and posture**
  - Stride, stance
    - truncal sway, arm swing
  - Posture: slumped, falling forward, backward
  - Freezing
    - in doors, on or off medication at start of walking
Disorders of muscle tone

I. HYPERTONICITY

a. Upper motor neuron syndrome
   1. Loss of strength - paresis or paralysis
   2. Loss of fine distal movements
   3. Spasticity (clasp-knife, velocity-dependent)
   4. Increased (velocity-dependent) deep tendon reflexes

b. Extrapyramidal rigidity
   1. Plastic, lead-pipe, equally increased tone throughout
   2. Normal deep tendon reflexes
   3. No paralysis of movement

II. HYPTONICITY

a. Cerebellar disease - acute
b. Deep coma

III. GEHENHALTEN

Resistence to passive manipulation, unable to relax, confusion, frontal lobe disease, basal ganglia disease

Basal Ganglia

- Subcortical forebrain structures connected to sensorimotor and limbic systems
- Crucial part of the “control circuitry” that allows for the smooth execution of voluntary movement

Basal Ganglia

- Multiple cortico-basal ganglia-thalamo-cortical circuits
- Help program and carry out motor plans
- Scale the amplitude and effort of the execution of tasks with relation to requirements
- Incorporate motivation and emotional drives

Diagram showing the normal and Parkinson’s disease states of the basal ganglia system.
Basal ganglia disease

- Tremor
- Dystonia

Basal ganglia disease

- Chorea
- Athetosis
- Ballism

Myoclonus

Tics

Akathisia

Neurologic Issues Relevant to Dentistry

Bell's palsy
Bell’s palsy

Initial presentation After 6 months

Neurologic Issues Relevant to Dentistry

Disorders affecting the face, jaw, mouth and neck
- Trigeminal neuralgia
- Temporo-mandibular joint disorders
- Other facial pains
- Jaw tremors
- Bruxism
- Tardive dyskinesia
- Meige’s syndrome
- Other oro-buccal facial dystonias
- Torticollis

Other Neurologic Issues Relevant to Dentistry

Complications of anesthesia

Malignant Hyperthermia

Sudden onset of high fever
- Temperature rise → 42-43°C
- Tachypnea, tachycardia
- Loss of brainstem reflexes
- Circulatory collapse
- Rigidity in all muscles → high CK and myoglobinuria
- Jaw clenching - unexpected after relaxation from anesthesia
- Anesthetic agents halothane, succinylcholine, ether

Pathogenesis:
- a. Anesthesia lead to increase in O₂ consumption
- b. Depletion of ATP
- c. Muscles unable to relax (muscles require energy to relax)

Treatment:
- D/C anesthesia at first sign
- IV dantrolene - inhibits Ca ++ release
- Cooling, hydration, sodium bicarbonate

Susceptible patients:
- Family history of anesthetic-related problems
- Musculo-skeletal abnormalities
- Short stature, ptosis, high arched palate