

# MOVEMENT DISORDERS GENERAL OVERVIEW

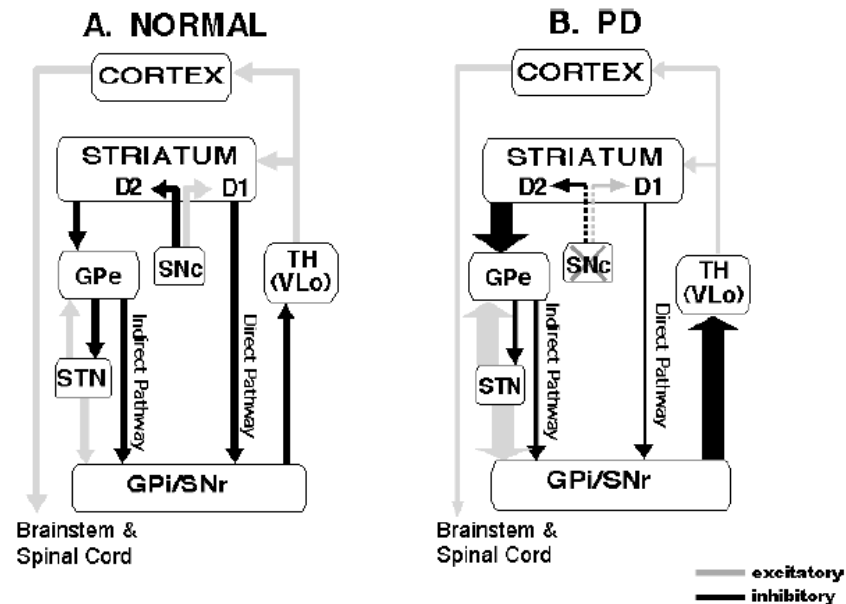


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# BASAL GANGLIA CIRCUITRY

## The Model for Understanding Basal Ganglia Function in PD



# Movement disorders

- Hypokinesia (Decreased movements)
- Hyperkinesia (Increased movements)

# Hypokinesias

- **Parkinsonism**

1. Akinesia/Bradykinesia
2. Rigidity
3. Motor Freezing

- Spasticity

- Apraxias

- Tics (Blocking & Holding Tics, Obsessional Tics)

- Psychiatric

- Catatonia
- **Psychomotor Depression**
- Psychogenic Parkinsonism

- Cataplexy/Drop Attacks

- **Hypothyroidism** or other Endocrinologic Disorders

- **Hesitant Gait of the Elderly**

# MSK RELATED

- **1- DJD**
- **2- Rheumatologic disorders**
- **3- Fractures**

# Hyperkinesias and Dyskinesias

- **Tremor**
- Chorea
- Dystonia
- Myoclonus
- **Ataxia and Dysmetria**
- Stereotypies and Tics
- **Akathisia**
- Myokymia and Synkinesias
- **Restless Legs**
- Periodic Hypnagogic Movements (PLMS)

# Movement Disorders -- Parkinsonisms

- **Parkinson's Disease**
- Diffuse Lewy Body Disease
- Multiple Systems Atrophy (+/- Ataxia)
- Progressive Supranuclear Palsy
- Corticobasal Degeneration
- **Vascular Parkinsonism**
- Post Traumatic Parkinsonism
- **Secondary (Toxin, Medication, Metabolic)**



# **PARKINSONISMS**

# Idiopathic Parkinson's Disease

- Usually Asymmetric
- Cardinal Signs
  - Tremor
  - Rigidity
  - Bradykinesia
- Levodopa Responsive
- Later Findings
  - Postural Instability
  - Levodopa-unresponsive gait disorder
  - Non Motor Features (Depression, Sexual Dysfunction, Cognitive Dysfunction of Variable Severity)

# Diffuse Lewy Body Disease

- Unlike PD, Lewy Bodies rapidly spread throughout the brain, including the cerebral cortex
- Levodopa Responsive Parkinsonism
- Rapidly Progressive Dementia
  - Hallucinations

# Multiple Systems Atrophy

- Cardinal Findings
  - Parkinsonism that is poorly responsive to Levodopa
  - Autonomic Failure (Low Blood Pressure)
  - Cerebellar Signs
  - Long Tract Signs (Spasticity)
- Striato-Nigral Type (Parkinsonism First)
- Shy-Drager Syndrome (Autonomic Failure First)
- Olivo-ponto-cerebellar Type (OPCA – Ataxia First)

# Progressive Supranuclear Palsy

- Early Postural Instability and Falls
- Parkinsonism (Unresponsive to Levodopa)
- “Stone Face”
- Dementia
- Ocular Signs

# Corticobasal Degeneration

- Asymmetric Parkinsonism with Poor Response to Levodopa
- Apraxia and Alien Limb
- Spasticity, Rigidity, Dystonia
- Gait and Balance Problems
- Dementia always occurs, but may be a late feature

# Drug Related Parkinsonism

- Haldol and other antipsychotic medications cause symmetric findings that are indistinguishable at times from Idiopathic Parkinson's Disease
- **Reglan (Metoclopramide) is a dopamine blocker and is an important cause of Parkinsonism in elderly patients (currently used as an anti-nausea medication)**

# HYPERKINESIAS



# Movement Disorders -- Tremor

- **Essential Tremor**
  - Limbs, Head, Voice
- **Dystonic Tremor**
  - Task Specific Tremors
- Midbrain Outflow Tremors
  - Cerebellar Tremor
  - Rubral Tremor
- Rest Tremor (Parkinsonism)
- Orthostatic Tremor
- **Exaggerated Physiologic Tremor**
  - Caffeine, Medication Withdrawal
- Other (Drug Related Tremor)

# Essential Tremor

- Upper Extremity Tremor with Posture and/or Action
- Bilateral, usually roughly symmetric
- Typically of Long-Standing Duration
- Other Areas May Be Involved
  - Head or Jaw
  - Voice
  - Lower Extremities
- Tremor may produce disability, but often doesn't
- No clear association with other diseases or disorders

# Myoclonus

- Not a Tremor
- Sudden, shock-like muscle contractions
- Focal, Multifocal, or Generalized
- May be regular and rhythmic, but usually irregular and jerky
- Epileptic or Non-Epileptic
  - Cortical (Epileptic)
  - Brainstem or Spinal Segmental (Non-Epileptic)

# Chorea

- Excessive Spontaneous Movements
- Irregular, Random, Brief and Abrupt
- Non-repetitive
- Distal Predominance
- Flitting randomly from one body part to another
- Purposeless, but may be disguised (parakinesias)
- Facial grimacing and abnormal respiratory sounds

# Chorea -- Causes

- MEDICATIONS (e.g. tardive dyskinesia)
  - Haldol, other antipsychotics
  - Reglan is an important cause of tardive dyskinesia
- Huntington's Disease
- Hemiballism (Stroke)
- Post-Infectious (Strep Infection)
- Pregnancy
- Other Disorders

# Tics

- Semi-voluntary (e.g. suppressible), rapid, non-rhythmic movements or sounds
- Background of normal activity
- Associated Compulsions
- May be associated with OCD
- Occasionally tics are disabling, but the OCD is usually the more disabling condition, if it exists

# Akathisia

- Motor restlessness with a “desire to move”
- Difficult for patients to describe
  - “I feel like I’m always crawling out of my skin”
- Often with associated vocalizations and grunting
- Often very disabling
- Cause: MEDICATIONS – antipsychotics and Metoclopramide (Reglan)

# Dystonia

- Sustained, patterned muscle contractions
- Agonists and Antagonists
- Clinical Findings
  - Repetitive Twisting or Squeezing Movements
  - Fixed Postures
- Localization
  - Focal
    - Face (Blepharospasm and Meige Syndrome)
    - Neck (Cervical Dystonia)
    - Limbs (Task Specific Dystonias)
  - Segmental
  - Generalized



# Causes of Dystonia

- Idiopathic (Most Cases)
- DRUG RELATED
  - Antipsychotics and Reglan
- Genetic (DYT-1 Gene)
- Structural
  - Trauma
  - Stroke
  - Multiple Rare Diseases

# Ataxia

- Symptomatic Interruption of the Cerebellar Pathways
  - Dysmetria (Poor targeting of planned movements)
  - Dysdiadochokinesia (Poor sequencing of planned movements)
  - Intention Tremor (Past Pointing)
- Gait Abnormalities
  - Wide based gait
  - Poor balance
    - “Drunken Sailor’s Walk”

# Causes of Ataxia

- Lesion in the following areas of the brain
  - Cerebellum
  - Pons
  - Midbrain (Red Nucleus)
  - Olivary Nucleus
  - Thalamus (Cerebellar Inflow Nucleus)

# Causes of Ataxia

- Acute intoxication (Alcohol, Dilantin, others)
- Chronic Substance Abuse (including Alcohol)
- Stroke
- Multiple Sclerosis
- Brain Tumors
- Genetic Ataxias
  - Autosomal Dominant Ataxias
  - Autosomal Recessive Ataxias
- Metabolic
  - Vitamin E, Thiamine,
- Multiple Systems Atrophy

# Restless Legs

- Bothersome urge to move legs at night
- Prevents sleep

# Treatment of Parkinson's Disease

- Levodopa and Dopamine Agonists
- Amantidine, MAO-B Inhibitors
- Deep Brain Stimulation (Subthalamic Nucleus, Globus Pallidus Interna)

# Treatment of Dystonia

- Artane, Valium, occasionally Baclofen
- Botulinum Toxin Injection
- Deep Brain Stimulation (Globus Pallidus Interna)

# Treatment of Essential Tremor

- Primidone
- Propranolol and other Beta Blockers
- Deep Brain Stimulation (Thalamus)
- Tremors of some patients are quite responsive to alcohol, and patients may self-medicate



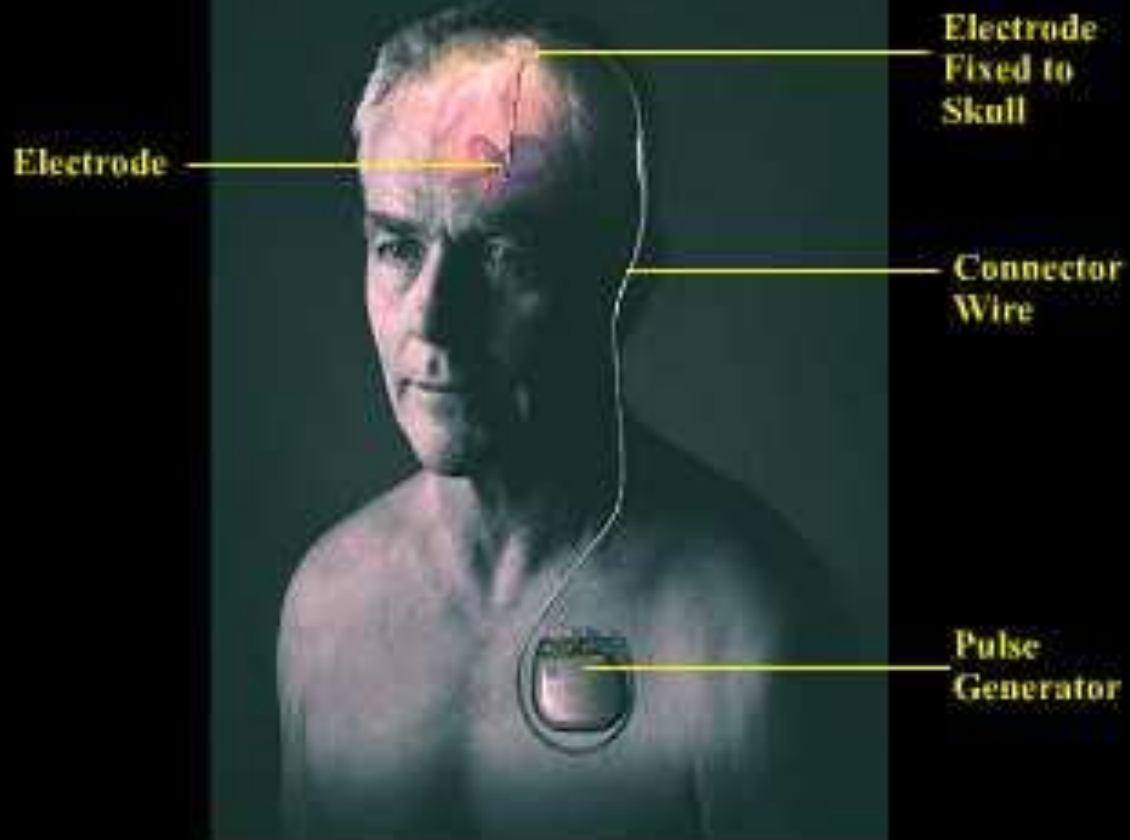
# Treatment of Tardive (Post Dopamine-Blockade) Movement Disorders

- PREVENTION
- Dopamine Depleting Agents (Difficult to Obtain in the U.S.)
- Ramp up dopamine blockade (often worsens the underlying pathologic process)
- Life Long Botulinum Toxin Injections
- Deep Brain Stimulation

# Complications of Dopamine Blocking Agents

- Reversible? Sequelae Include
  - Tremor
  - Parkinsonism
- Permanent and Difficult to Treat Sequelae Include
  - Tardive Dyskinesia (Chorea-like syndrome)
  - Tardive Akathisia
  - Tardive Dystonia (Long Term Botox, may need DBS)

# DBS



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