MOVEMENT DISORDERS IN THE ELDERLY

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MOVEMENT DISORDERS

Neurologic dysfunctions in which there is either
a paucity of voluntary and
automatic movements
(HYPOKINESIA)
or an excess of movement
(HYPERKINESIA)
or uncontrolled movements
(DYSKINESIA)
typically unassociated with weakness or spasticity

HYPOKINESIAS

- Parkinson's disease
- Secondary Parkinsonism
- Parkinson's plus syndromes

HYPERKINESIAS

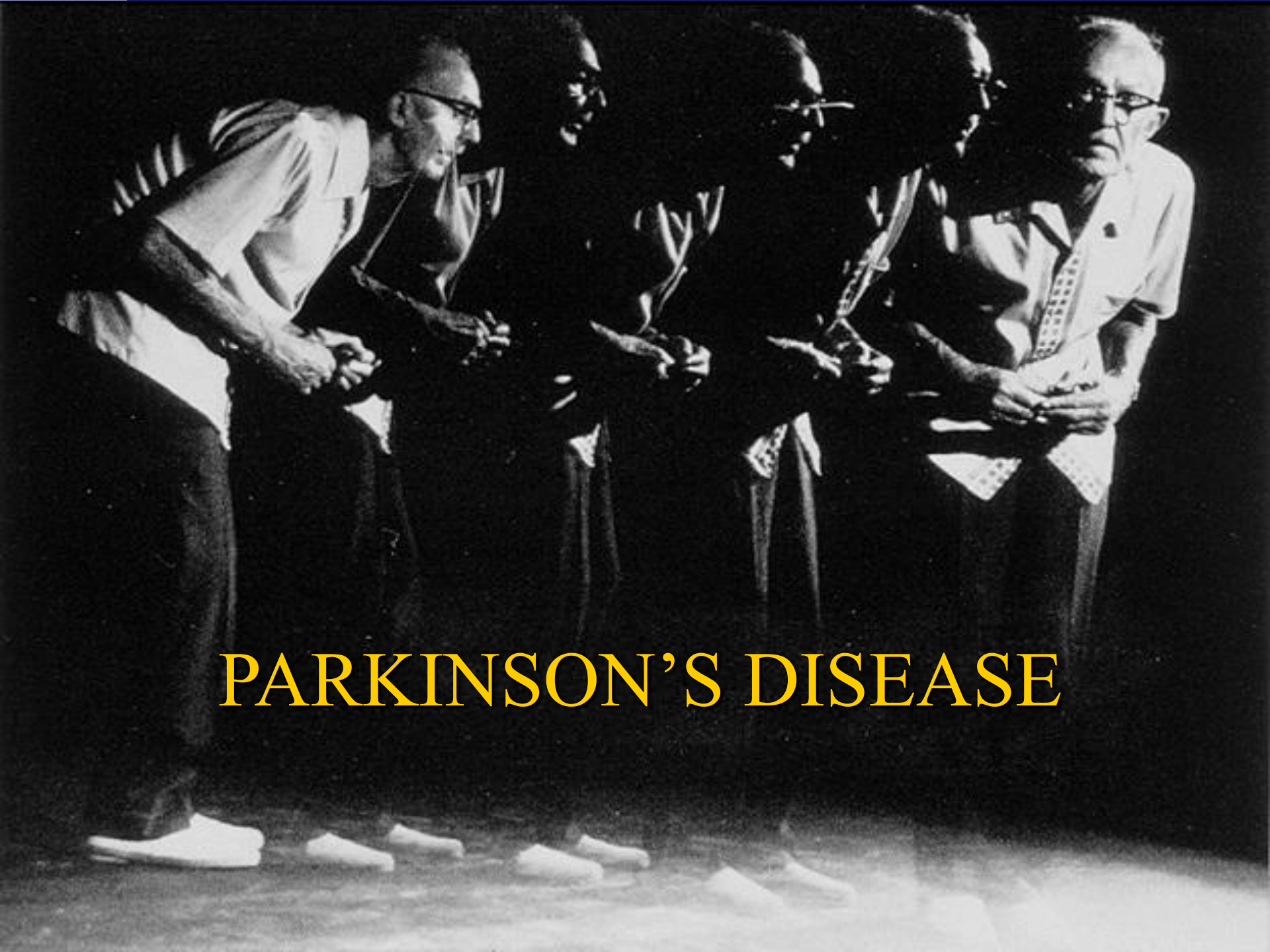
- Akathisia
- Athetosis
- Ballism
- Chorea
- Dystonia
- Hemifacial spasm
- Myoclonus
- Restless leg syndrome
- Tics
- Tremor

COMMON MOVEMENT DISORDERS IN THE ELDERLY

- Parkinsonism
- Tremor
- Gait disorder
- Restless leg syndrome
- Drug-induced syndrome

PARKINSONISM

- Parkinson's disease
- Secondary parkinsonism
  - Drug-induced parkinsonism
  - Vascular parkinsonism
- Parkinson's plus syndromes
  - Multiple system atrophy
  - Progressive supranuclear palsy


PARKINSON'S DISEASE

Parkinson's Disease

Tremor

Parkinson's Disease

Rigidity

Parkinson's Disease

Bradykinesia

PARKINSON'S DISEASE

Classical Clinical Features

- Resting Tremor
- Cogwheel Rigidity
- Bradykinesia
- Postural Instability

PARKINSON'S DISEASE

Associated Clinical Features

- Micrographia
- Hypophonia
- Hypomimia
- Shuffling gait / festination
- Drooling
- Dysphagia

NON-MOTOR COMPLICATIONS IN PARKINSON'S DISEASE

- Sleep disturbances
- Autonomic dysfunctions
- Sensory phenomena
- Neuropsychiatric manifestations
- Cognitive impairment

PARKINSON'S DISEASE

General Considerations

- The second most common progressive neurodegenerative disorder
- The most common neurodegenerative movement disorder
- It is a complex disease with variable symptoms
- Symptoms and neuropathology are well characterized
- Pathogenesis of PD is not clear
- May be multifactorial and heterogeneous in etiology
- Misdiagnosis rate of PD is about 10-25%

PARKINSON'S DISEASE

Incidence and Epidemiology

Prevalence Rate : 200 per 100,000

Rare for individuals < 40 years of age

1% for individuals > 60 years of age

2% for individuals > 85 years of age

Men > Women

Incidence rate : 20 per 100,000 (annually)

PARKINSON'S DISEASE

Features supporting diagnosis

- Unilateral symptom onset
- Characteristic resting tremor
- Narrow-based gait with flexed/ stooped posture
- Reduced arm swing with tremor when walking
- Sustained and significant levodopa effect

PARKINSONISM

AAN Practice Parameter Recommendations:

Clinical features distinguishing other parkinsonian syndromes from PD

- Falls at presentation and early in the disease course
- Poor response to levodopa
- Symmetry at onset
- Rapid progression of postural imbalance and dysfunction
- Lack of tremor
- Early dysautonomia

PARKINSON'S DISEASE

Poor Prognosis for Morbidity & Mortality

- Age
- Postural Instability Gait Disorder (PIGD) subtype
- Medical co-morbidities
- Cognitive impairment
- Immobility and lack of exercise
- Lack of specialty attention

TREATMENT OPTIONS FOR PARKINSON'S DISEASE

- Pharmacological treatments
- Non-pharmacological treatments
- Surgical treatments

PARKINSON'S DISEASE

Pharmacological Treatments

- Monoamine oxidase-B inhibitor
- Levodopa
- Anticholinergics
- Dopamine agonists
- COMT inhibitor

NON-PHARMACOLOGIC INTERVENTIONS IN PD

- **Education**
  - **from healthcare providers & support groups**
  - **avoid misinformation & incomplete information**
- **Support**
  - **professional & peer support**
  - **emotional & financial counseling**
- **Exercise**
  - **keep active & avoid deconditioning**
  - **regular stretching exercises**
  - **physical therapy**
- **Nutrition**
  - **balanced diet & suitable consistency**
  - **nutritional counseling**

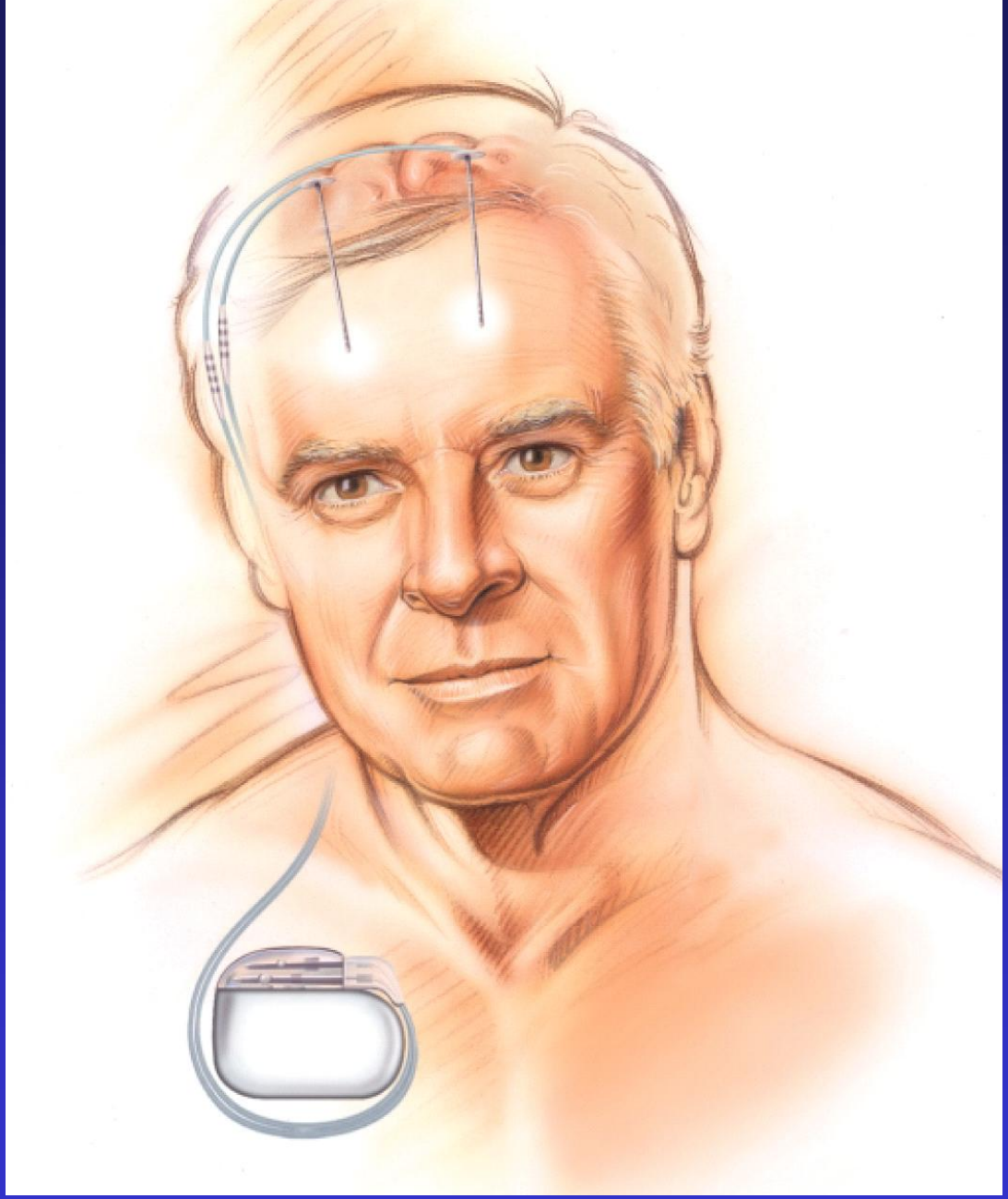
COMPLICATIONS IN ADVANCED PARKINSON'S DISEASE

- Motor fluctuations
- Dyskinesias
- Posture, gait, falling
- Neuropsychiatric problems
- Sleep disorders
- Sensory phenomena
- Dysautonomias
- Speech disturbances

Exercise Class

MEDICALLY REFRACTORY SYMPTOMS OF ADVANCED PD

- Dopa-induced dyskinesia
- Excessive tremor
- “On-off” motor fluctuation
- Rigidity with pain
- Freezing



Deep Brain Stimulation

DEEP BRAIN STIMULATION (DBS)

- High frequency, pulsatile electrical stimulation
- Stereotactically placed into target nucleus
- Can be activated and deactivated by an external magnet
- Exact physiology unknown, but higher frequencies mimic cellular ablation, not stimulation

DBS vs. BMT CONCLUSIONS

- 255 patients randomized to BMT (134) and DBS (121) and followed for 6 months.
- 'Off' time reduced by 47% and 'On' time without troublesome dyskinesia improved by 81%.
- DBS is superior to BMT in improving PD motor function and quality of life.
- Adverse events are significant in patients undergoing DBS.
- Mild neurocognitive changes are observed in DBS patients.
- Benefits of DBS need to be weighed against the risk of complications related to surgery.
- Caution should be exercised against over- or under-stating the risks of DBS for PD.

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TREMOR

Involuntary, somewhat rhythmic, muscle contraction and relaxation involving to-and-fro movements (oscillations or twitching) of one or more parts of the body

It is the most common of all movement disorders and can affect all parts of the body

COMMON FUNCTIONAL DISABILITIES IN TREMOR

- Handwriting
- Drinking liquids
- Fine manipulations
- Eating
- Dressing
- Speaking


Anxiety
Embarrassment

TREMOR

- Most common movement disorder in the elderly
- Affects men and women equally
- Rhythmic shaking of hands, arms, head, legs, voice
- Dysfunction of muscle control and coordination of agonist & antagonist muscles
- Triggered by or become exaggerated during stress or strong emotion, physical exhaustion, or with certain postures or movements
- Many causes: idiopathic, brain injury, drug-induced, alcohol, toxin (mercury), metabolic (thyroid & liver diseases)

CLASSIFICATION OF TREMORS

- Resting tremor
  - Parkinsonian tremor
- Action tremor
  - Postural tremor
  - Kinetic tremor
- Psychogenic tremor

RESTING TREMOR

- Idiopathic Parkinson's disease
- Pronation / supination
- Slower rate (5-6 Hz)
- Present when walking
- Reemergence tremor

ACTION TREMOR

- Essential tremor
- Physiologic tremor
- Dystonic tremor
- Cerebellar tremor
- Orthostatic tremor
- Task-specific tremor

ESSENTIAL TREMOR

- Present in about 4% of population over 65
- Probably hereditary, but exact etiology and pathology are unknown
- Affects both sides of body, but usually asymmetric: hands, arms, head, voice (tongue, legs, trunk)
- Typically high frequency tremor involving flexion/extension muscles
- Severity increases with age
- Reduction with alcohol and a positive family history are supportive information
- Treatment with beta-blocker, primidone, botulinum toxin injection or deep brain stimulation

PHYSIOLOGIC TREMOR

- Very fine, high frequency, low amplitude tremor
- Occurs in normal individual & typically without clinical significance
- Enhanced physiologic tremor is heightening PT to more visible levels
- Caused by strong emotion, physical exhaustion, hypoglycemia, hyperthyroidism, heavy metal poisoning, stimulants, alcohol withdrawal, or fever
- Usually reversible once the cause is corrected

DYSTONIC TREMOR

- Occurs in individuals with dystonia: sustained involuntary muscle contractions causing twisting and repetitive motions and/or painful and abnormal postures or positions
- Dystonic head tremor
- Occurs when the individual is in a certain position or moves a certain way
- Occurs irregularly and often relieved by complete rest
- Touching the affected body part or muscle may reduce tremor severity
- Responds well to botulinum toxin treatment

CEREBELLAR TREMOR

- Slow, high amplitude, irregular tremor that occurs at the end of a purposeful movement
- Caused by lesion in or damage to the cerebellum and its outgoing nerves by stroke, tumor, multiple sclerosis, degenerative diseases, alcoholism, and certain medications
- Often most prominent when the individual is active or is maintaining a particular posture
- May be accompanied by dysarthria, nystagmus, and gait ataxia

ORTHOSTATIC TREMOR

- Rhythmic contractions that occur in the legs and trunk immediately after standing
- Cramps in thighs and legs
- Shakes uncontrollably when the individual is asked to stand in one spot
- No clinical signs or symptoms when the individual sits or is lifted off the ground


Basal ganglia

TASK-SPECIFIC TREMOR

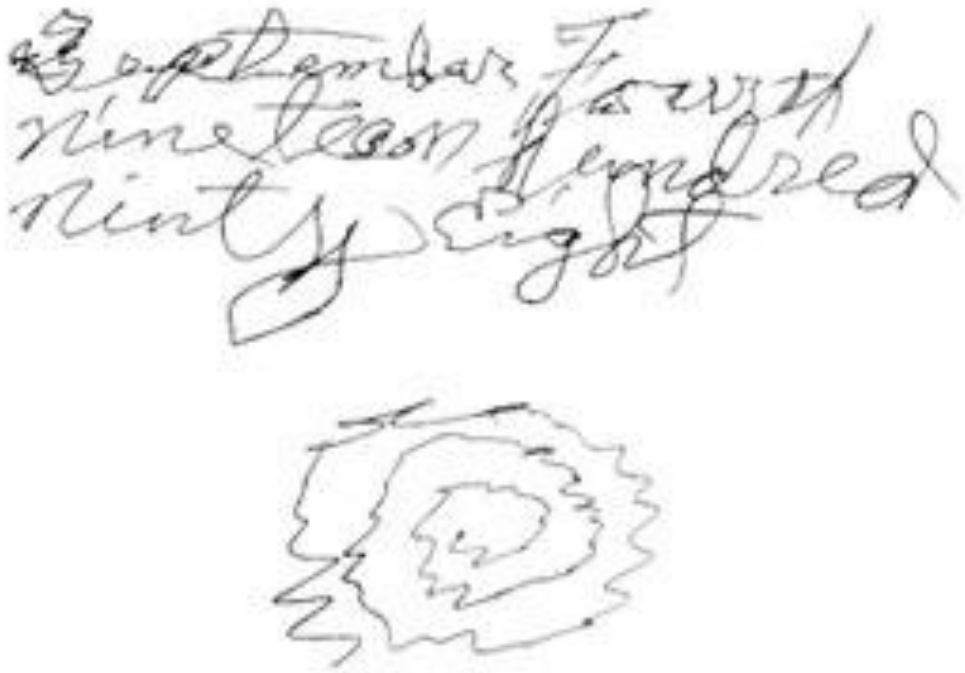
- Also known as focal tremor or occupational tremor
- Occurs mostly in hands when in a certain position or performing a certain task: writing, throwing a ball, bowing the violin, swinging a golf club, gripping a glass
- May benefit from beta-blocker, anticholinergic, or botulinum toxin injection

PSYCHOGENIC TREMOR

- Occurs at rest or during postural or kinetic movements
- Sudden onset and remission, increased incidence with stress
- Bizarre movements that are distractible, variable and inconsistent
- Associated with conversion disorder and psychiatric disease

SYMPTOMATIC TREATMENT OF ACTION TREMOR

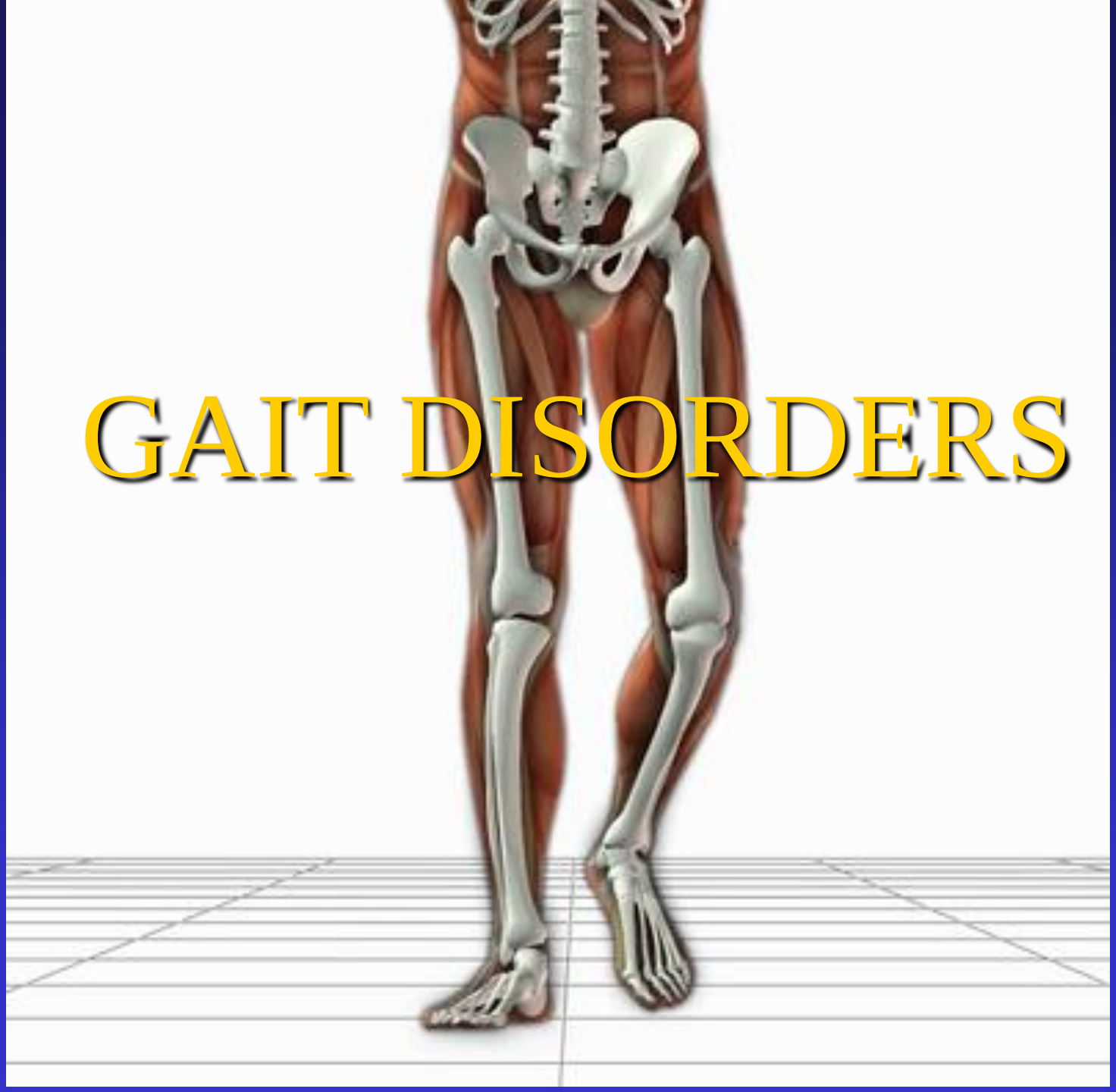
- Pharmacological therapy
  - Beta-blocker, anticholinergics, clonazepam
- Physical rehabilitation
  - Weighted bracelets, occupational therapy
- Botulinum toxin treatment
  - Intramuscular injection to weaken dominant muscles
- Neurosurgical procedure
  - Deep brain stimulation



Patient drawing before treatment

Same patient - drawing after treatment

GAIT DISORDERS



GAIT DISORDER

- Normal gait depends upon normal functioning of the nervous, muscular, skeletal, circulatory, and respiratory systems in a highly coordinated and integrated manner.
- Gait disorders are heterogeneous and often multifactorial
- Gait disorders are common in the elderly
- 15% of community-dwelling patients over 65 have gait impairment.
- Gait disorders cause immobility, fall injuries, and institution of patients

GAIT DISORDER

- > 2 unexplained falls in previous year
- Needs walking aid
- Cannot walk more than 300 feet
- Cannot go up 15 steps of stairs without support
- Housebound and goes out only when assistance and/or transportation is available
- Walking speed <50% of previous best speed
- Condition existed more than one month

EFFECTS OF AGE ON GAIT AND BALANCE

- Slowing of walking speed
- Decrease in stride length
- Forward flexion posture
- Increase in body sway
- Increase in double-support stance time
- Decrease in push-off power
- Disorganization of muscle synergy
- Decline in dynamic balance
- Mild decrease in rotations of hip and knees
- Changes attributable to an adaptation related to a safer (less destabilizing) gait stride

BALANCE AND GAIT ABNORMALITIES WITH FALLS IN THE ELDERLY

BALANCE

- Unsteady sitting down
- Unable to stand on one leg unsupported
- Unsteady turning
- Unsteady after gentle push

GAIT

- Increase trunk sway
- Unable to pick up walking pace
- Increase path deviation

SYNDROMES OF GAIT DISORDERS

- Akinetic-rigid syndrome
  - Parkinsonian gait
- Ataxic syndrome
  - Cerebellar ataxia
  - Sensory ataxia
- Frontal lobe syndrome
  - Multi-infarct state
  - Hydrocephalus

SYNDROMES OF GAIT DISORDERS (Cont.)

- Upper motor neuron syndrome
  - Hemiparetic gait
  - Spastic gait
- Lower motor neuron syndrome
  - Steppage gait
  - Waddling gait
- Mixed gait syndrome
  - Senile gait
  - Vertiginous gait
- Hysterical gait syndrome

SENILE GAIT SYNDROME
(A Mixed Condition)

- Age related gait decline
- Slow, wide-based, shuffling
- Multiple mild sensory deficits
- Modest leg weakness
- Cervical and lumbar spondylosis
- Loss of confidence when walking

NORMAL PRESSURE HYDROCEPHALUS

- Syndrome of gait disturbance, urinary incontinence, and a dementing process
- Gait disturbance is early and prominent in this condition
- Characterized by wide-based ‘magnetic’ gait and unsteadiness
- Diagnosis is by neuroimaging and large volume cerebrospinal fluid drain
- Treatment is by CSF shunting procedure

RISK FACTORS FOR FALLS IN THE ELDERLY

- Use of sedatives
- Cognitive impairment
- Lower-extremity disability
- Foot problems
- History of previous falls
- Acute illness
- Age

TREATMENTS TO IMPROVE MOBILITY AND AVOID FALLS

- Keep active
- Exercise regularly
- Physical therapy
- Adjust medication regimen
- Sensory cues
- Assistive devices
- Safety-proof living environment

RESTLESS LEG SYNDROME

RESTLESS LEG SYNDROME

- Very common movement disorder
- Occurrence and intensity increase with age
- 10-12% of adults and >19% in those 80 years or older
- Disagreeable and troublesome sensation in legs
- Diagnostic criteria:
  - Urge to move legs
  - Worsening of symptoms with rest
  - Relief with activity
  - Intensification during the evening

RESTLESS LEG SYNDROME

RESTLESS LEG SYNDROME

- Causes anxiety, sleep deprivation, malaise, fatigue
- Associated with iron deficiency, peripheral neuropathy, kidney or liver disease, and offending medications
- Recognizing symptoms and seeking medical attention are important
- Accompanied by periodic limb movements of sleep

RESTLESS LEG SYNDROME

- Treatments include:
  - Removing offending medications: SSRI, neuroleptics, Li, antihistamines, MAOI
  - Iron supplement
  - Medical treatment
  - Avoid idleness
  - Good sleep hygiene
  - Dopamine agonist
  - Opiates

DRUG-INDUCED MOVEMENT DISORDERS

- Caused by dopamine-receptor blocking agents, antiepileptics, stimulants, alcohol, heavy metal
- 5% annual risk of tardive syndromes in the elderly taking traditional neuroleptics – 20-26% in 5 years
- Exposure within 6 months of symptom onset and lasting at least 1 month after drug cessation
- Risk factors include: older age, women, longer use and higher dose of offending drug, diabetes, organic brain damage
- Treatment include: removing the offending drug, anxiolytics, anticholinergics, botulinum toxin, tetrabenazine

DRUG-INDUCED MOVEMENT DISORDERS

- Tardive parkinsonism
  - Slowness, stiffness, tremor, abnormal gait
  - Caused by: metoclopramide, neuroleptics, antiemetics
- Tardive dystonia
  - Muscle spasm, sustained posturing, facial twitching, stiffness in limbs
  - Caused by: neuroleptics, antiemetics, SSRI
- Tardive dyskinesia
  - Stereotypic orofacial movements, chorea, dystonia, akathisia
  - Caused by: neuroleptics, antiemetics

DRUG-INDUCED MOVEMENT DISORDERS

- Drug-induced tremor
  - Exacerbation of physiologic tremor or essential tremor
  - Caused by epinephrine, theophyline, lithium, divalproax, amphetamines, phenothiazines, alcohol withdrawal
  - Treatment: cessation of drug, anxiolytics
- Drug-induced gait disorders
  - Caused by: antiepileptics, cyclosporine, methotrexate, lithium, amidarone, barbiturates, antineoplastics, dextromethophan, phencyclidine, alcohol
  - Treatment: cessation of drug, physical therapy

MOVEMENT DISORDERS IN THE ELDERLY

Summary

- Movement disorders are common in the elderly
- Many of them share features of slowness, stiffness, tremor, unsteadiness
- Distinguishing them from normal aging process can be challenging
- Some of them are highly treatable
- Recognizing them and seeking appropriate treatment are important

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