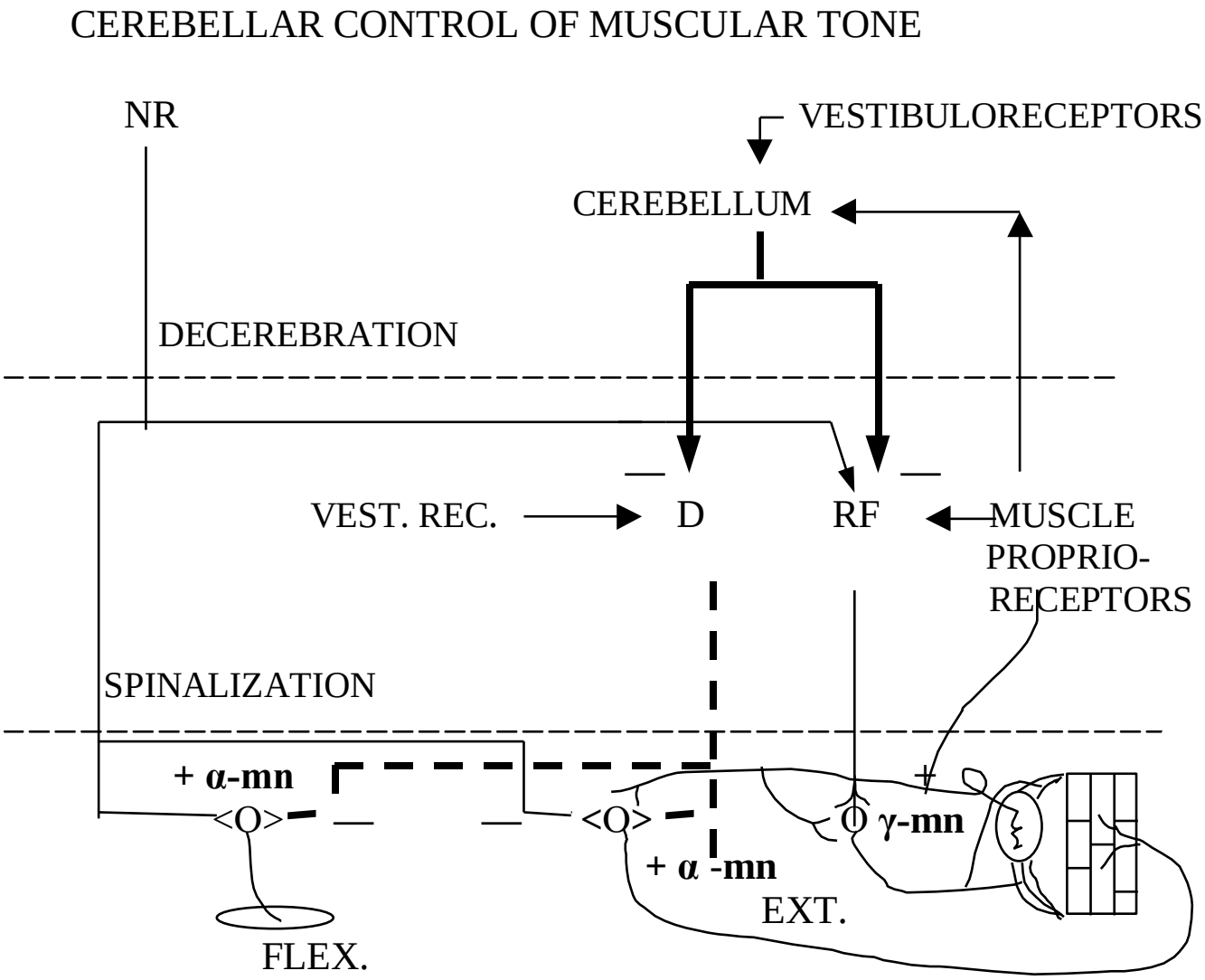
Lecture 5. The role of the forebrain, sriapallidum and cerebellum in the regulation of motor functions of the body.

CEREBELLAR CONTROL OF MUSCULAR TONE



SYMPTOMS OF CEREBELLAR DISODER

- Dystonia - disturbed regulation of muscular tone
- Astasia - loss of the ability of the muscles for harmonious contraction
- Asthenia - quick tiring due to excessive movements
- Ataxia - inadequate coordination of movements, disorders in their intensity, scope, speed and direction
- Abasia - inability to keep standing posture
- Adiadochokinesis - inability to perform quick movements with groups og antagonist muscles

STRIOPALLIDAR SYSTEM FUNCTIONS

1. Regulation of acurate hand movements
2. Keeping movement programs
3. Regulation of vegetative functions
4. Switches on programs of instinct behaviour (orientation, defense reflexes).

Mediators:

- Substantia nigrum neurons secrete ***dopamine***
- N.caudatum & claustrum neurons – are connected with pallidus, they secrete **GABA**
- Cortex neurons send impulses to striatum & secrete **acetylcholine**

Pathological signs at strio-pallidum affection

- When globus pallidum is affected hypokinesia develops
- In rheumatic chorea both hypo -& hyperkinesias develop, mimic muscles are affected, handwriting is changed

PARKINSON DISEASE CLINICAL SIGNS

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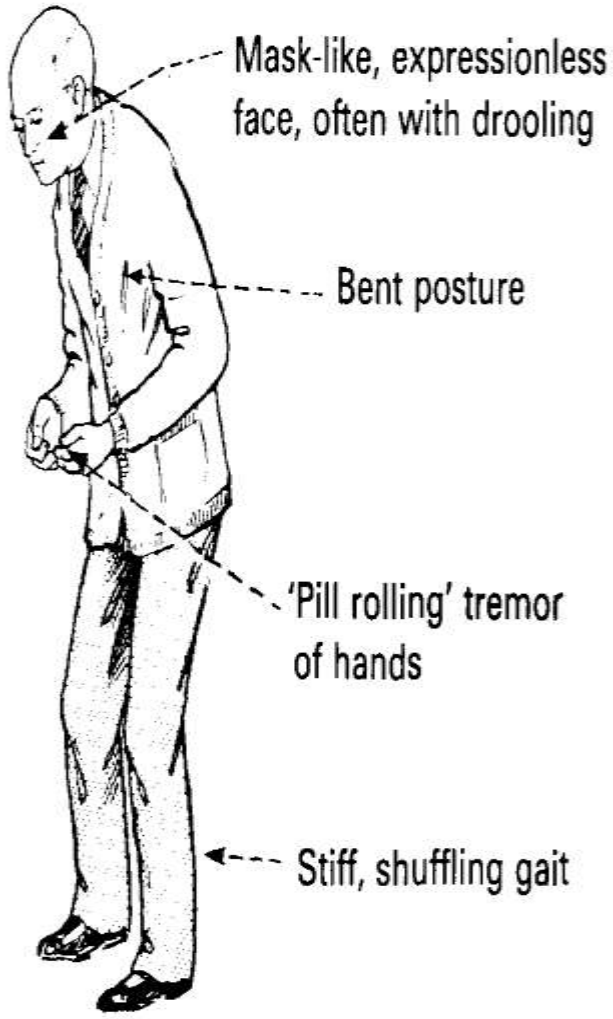
CLINICAL FEATURES

Initial symptoms are vague, the patient often complains of aches and pains.

1. A coarse TREMOR at a rate of 4 per second usually develops early in the disease. It begins unilaterally in the upper limbs and eventually spreads to all four limbs. The tremor is often '*pill rolling*', the thumb moving rhythmically backwards and forwards on the palm of the hand. It occurs at rest, improves with movement and disappears during sleep.



2. RIGIDITY is detected by examination. It predominates in the flexor muscles of the neck, trunk and limbs and results in the typical '*flexed posture*'.

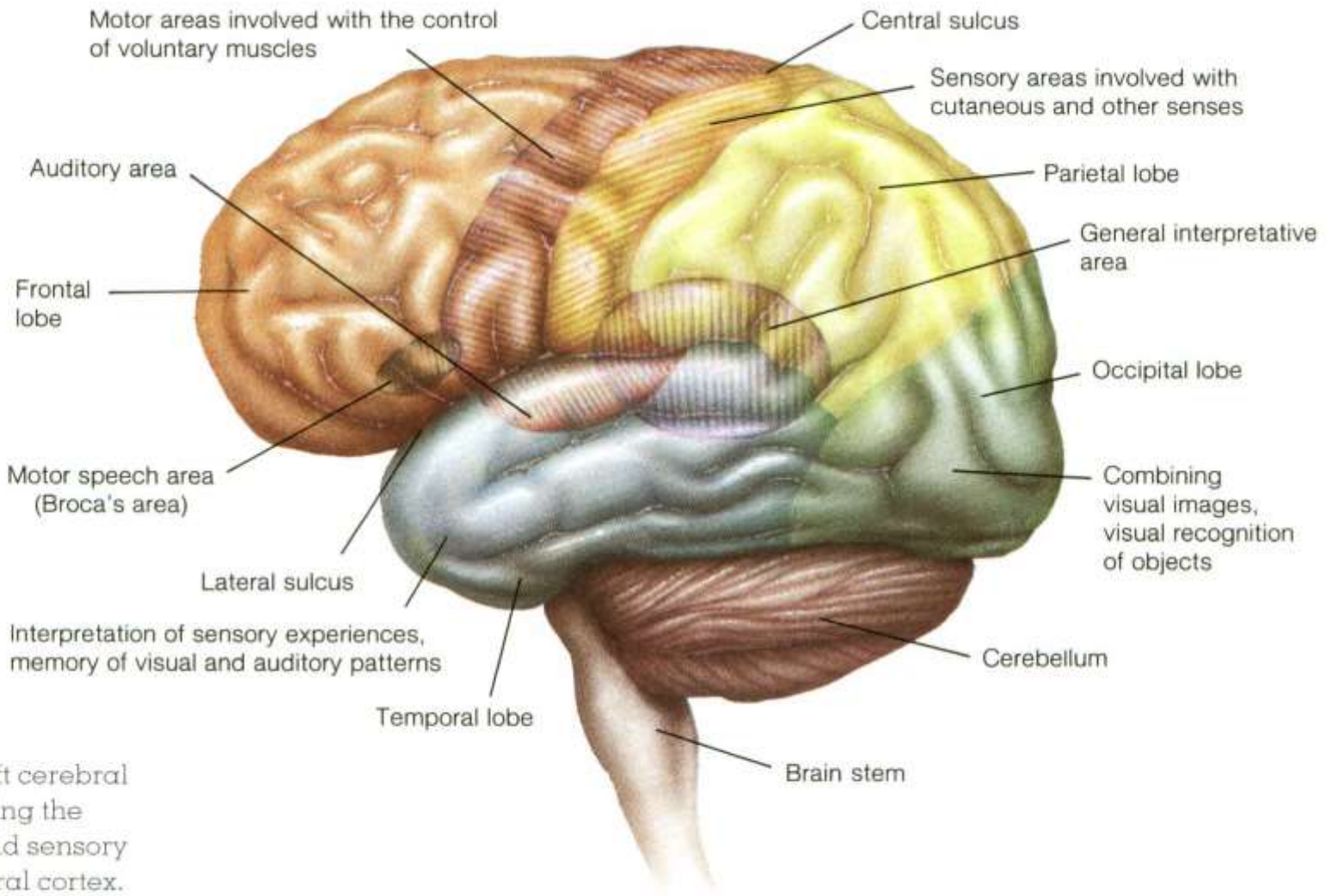
3. BRADYKINESIA: This slowness or paucity of movement affects facial muscles of expression (mask-like appearance) as well as muscles of mastication, speech, voluntary swallowing and muscles of the trunk and limbs. Dysarthria, dysphagia and a slow deliberate gait with little associated movement (e.g. arm swinging) result.

Tremor, rigidity and bradykinesia deteriorate simultaneously, affecting every aspect of the patient's life:

Handwriting reduces in size.

The gait becomes shuffling and festinant (small rapid steps to 'keep up with' the centre of gravity) and the posture more flexed.

Rising from a chair becomes laborious with progressive difficulty in initiating lower limb



The lobes of the left cerebral hemisphere showing the principal motor and sensory areas of the cerebral cortex.

MOTOR AREA

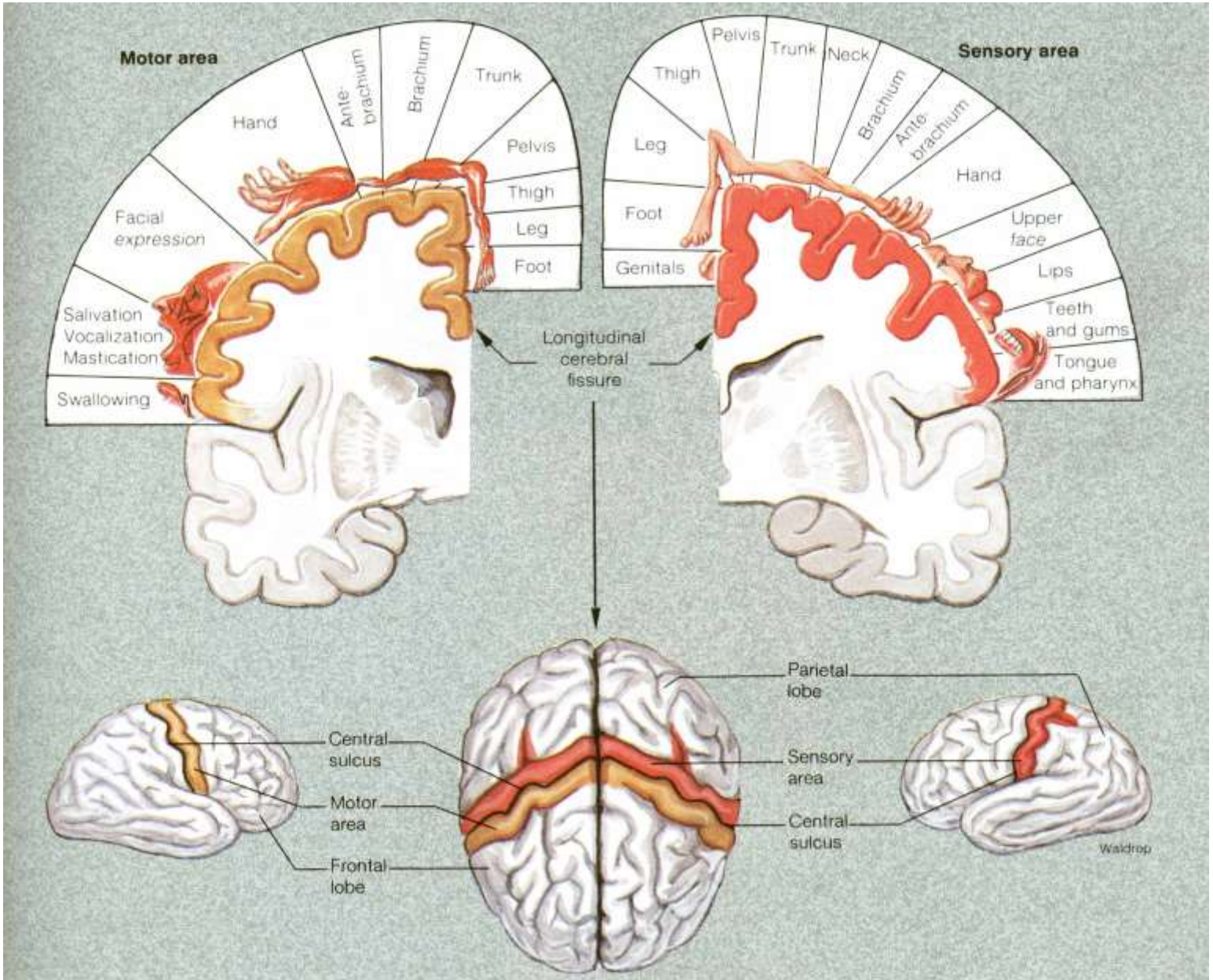
Heterotypical agranular zones

Motor zone - precentral gyrus

(pyramidal tract, voluntarily movements)

Homotypical

Associative areas – parietal & temporal



Motor and sensory areas of the cerebral cortex. Motor areas control skeletal muscles and sensory areas receive somatesthetic sensations.