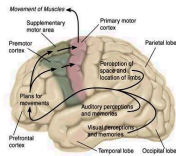


## Extrapyramidal system

• Cortical Control of Movement



- **Cortex – Brodman area 6 in F lobe**
- **Subcortical centres - basal ganglia**
- **Afferent and efferent pathways**

- **Corpus striatum**  
– nc. caudatus and nc. lentiformis (putamen + gl. pallidus)
- **Neostriatum (striatum)** - nc. caudatus and putamen
- **Paleostriatum (pallidum)** - gl. pallidus

## Functions of EPS

- **Neostriatum**
- Protect movements against undesirable afferent impulses to motor system – **lesion – hyperkinesia**
- **Lesion of nc. ventrooralis thalami – decreasing of hyperkinesia**
- Regulation of muscle tone – **lesion – hypotonia**

## Functions of EPS

- **Pallidum**
- Influence of neostriatum at motor cortex
- Increased muscle tone during voluntary and automatic movements
- **Lesion of pallidum and efferent pathways – decreased muscle tone**

## Functions of EPS

- **Lower parts of EPS, mainly substantia nigra**
- Soften (decreased) muscle tone
- Regulation of automatic movements – gait, mimic, protective movements
- **Lesion – increased muscle tone and affection of automatic movements**

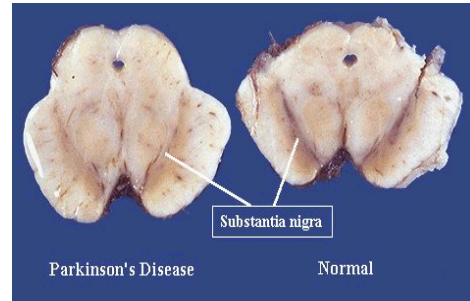
## Functions of EPS

- **Nc. subthalamicus – corpus Luysi**
- Coordinate afferent impulses to movements on the contralateral side of the body
- **Lesion – hyperkinesia on the contralateral side of the body**

## EP syndromes

- Hypertonic – hypokinetic syndrom
- Hypotonic – hyperkinetic syndrom
- Dystonic syndromes

## Hypertonic – hypokinetic syndrom



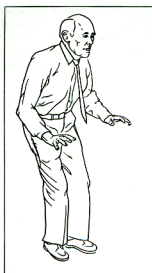
## Hypertonic – hypokinetic sy

- Increased muscle tone – **rigidity**
- Flexion position of the body
- **Tremor** 3-7 Hz, at rest, temporarily suppressed when the limb is voluntarily moved, disappears during sleep
- Increased ERP

## Hypertonic – hypokinetic sy

- Increased axial reflexes
- **Hypokinesia**
- Micrographia
- Hypomimia
- Slow steps
- Decreased protection in dysbalancia
- Paradox kinesis

## Hypertonic – hypokinetic sy



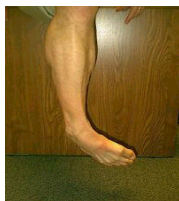
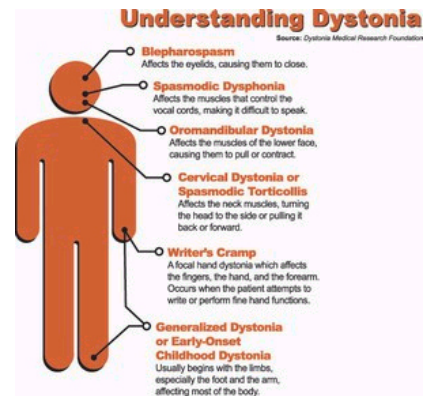
- Gait
- Slow steps
- Anteflexion position of the body
- dysbalance

## Hypotonic – hyperkinetic sy

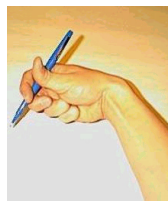
- **Chorea** (putamen, nc. caudatus)
- Decreased muscle tone, ERP
- **Choreic movements** purposive movement following one another in a disorderly fashion
- **Athetosis** (striatum, pallidum externum)
- Athetoid movements are slower, coarser

## Dystonia

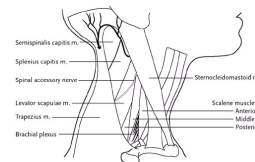
- abnormal postural state of one limb, neck or other body segment
- generalised forms involved the trunk
- produced by abnormal cocontraction of agonist and antagonist group of muscles
- forms of dystonia - torsion of the back or neck, neck extension, dystonia of fingers, forceful closure of the eyes



Focal dystonia



Writer's cramp



## Torticollis



## Torticollis

## Retrocollis

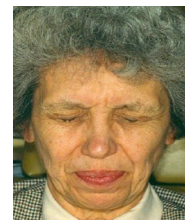


## Laterocollis

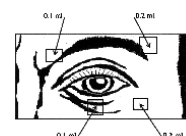
## Ventrocollis

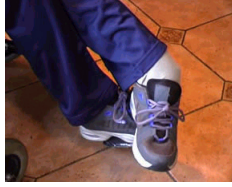
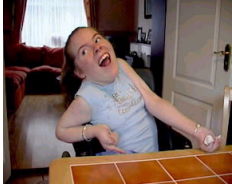


FIG. 2. Mechanisms and onset of eye closure and eye opening in a patient with blepharospasm. FIG. 3. Onset of eye opening and retraction in a patient with blepharospasm.



## Blepharospasm





**Generalised dystonia**