

NX 423

Translational Neuroengineering

Parkinson's disease

February 29, 2024 // Olaf Blanke

Parkinson's disease

Described clinically 200 years ago by James Parkinson ('*An essay on the shaking palsy*' - 1817).

Linked to substantia nigra and Lewy body pathology 100 years ago.

Linked to nigro-striatal neurons and pathway, striatal dopamine depletion & dopamine replacement therapy 60 years ago.

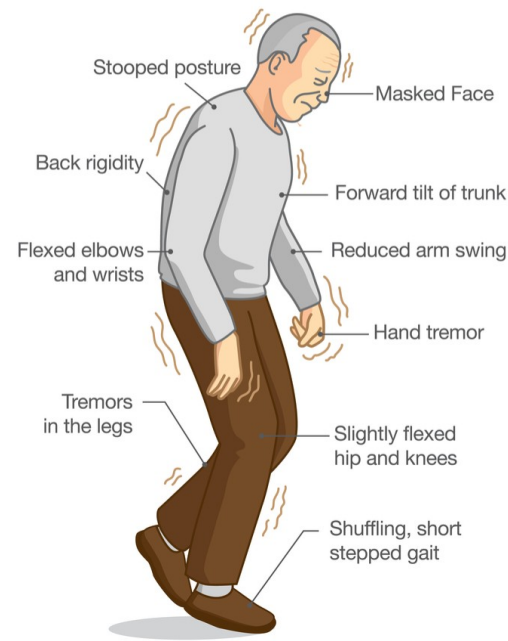
But, definitive clinical tests and procedures to diagnose PD remain a major unmet goal: Diagnosis still relies only on clinical features à la James Parkinson

Diagnosis can be challenging, because there are many different symptoms. Not only motor symptoms, but also many non-motor symptoms (depression, loss of smell, cognitive decline, hallucinations, sleep disruption, ...)

Powerful treatments (dopamine, deep brain stimulation) exist, but they are symptomatic and are not efficient for many of the non-motor symptoms & do not halt the progression of the disease.

→ Current research searches for early markers for PD & disease-altering therapies to stop PD progression.

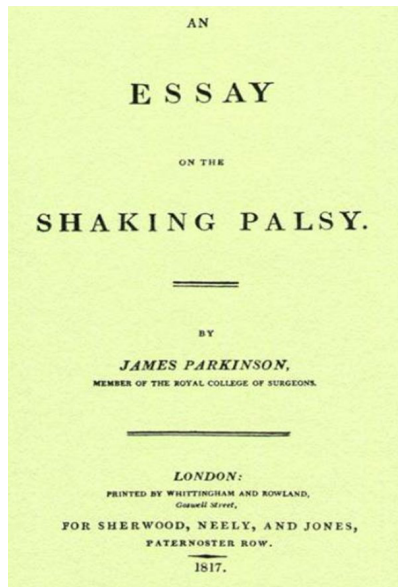
(Genetic and molecular causes of PD are starting to be uncovered; these are not covered in this class).





James Parkinson

first clinical description of PD



James Parkinson (1755-1824)

1817 paper is based on 6 cases (he only examined 3; the others were «observed» by J. Parkinson in the streets of London.

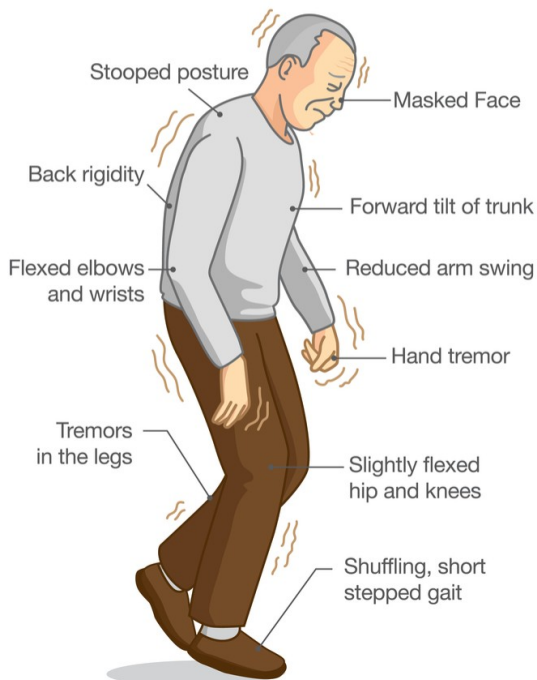
»...involuntary tremolous motion (...) not in action and when supported; with a propensity to bend the trunk forward, and to pass from a walking to a running pace; the senses and the intellect being uninjured.»

also describes long duration and progressive nature of PD

Wrote on many topics: medicine, politics, mental health, social reform, chemistry

Parkinson's disease

4 cardinal motor symptoms



4 cardinal motor symptoms

Bradykinesia (slowness of movements)

Resting tremor (shaking)

Rigidity (stiffness)

Axial symptoms (posture & gait)

... but also ...

speech deficits (dysarthria)

swallowing problems (dysphagia)

Handwriting (dysgraphia)

...as well as many more motor symptoms

Resting tremor

L

Resting tremor

Bradykinesia



Finger tapping - bradykinesia