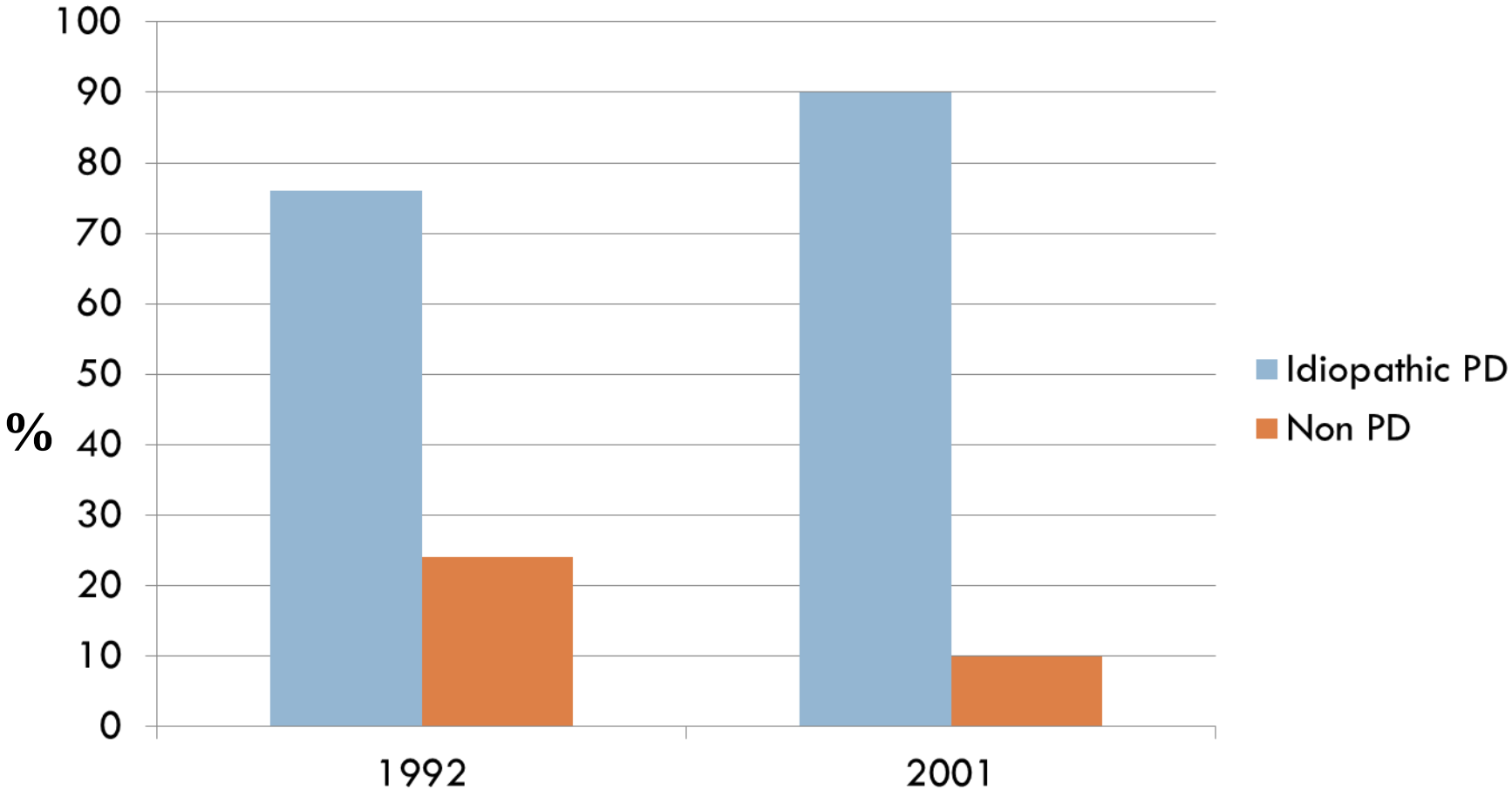
Diagnosis of parkinsonism

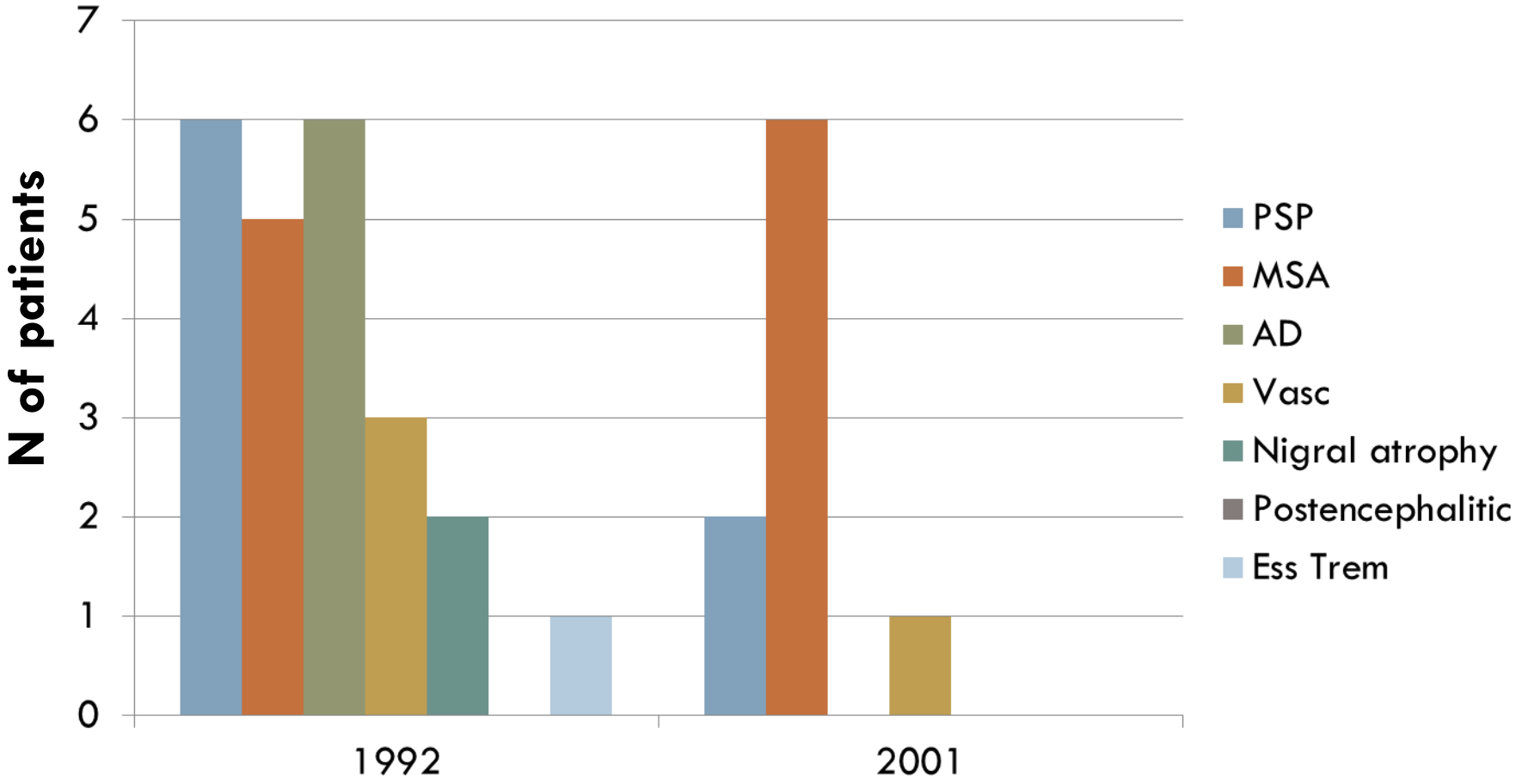
- Bradykinesia +
  - Tremor
  - Rigidity

Accuracy of clinical diagnosis of PD



(Hughes et al, 1992/2001; QSBB criteria)

Pathological diagnosis in patients who had a presumptive clinical diagnosis of PD



(Hughes et al, 1992/2001; QSBB criteria)

STEP 1: diagnosis of parkinsonism

- **Bradykinesia:** slowness of movement and decrement in amplitude or speed as movement are continued
- **Rigidity:** lead-pipe resistence (velocity-independent resistance to passive movements; cogwheel rigidity not sufficient)
- **Tremor:** 4-6 Hz tremor in the fully resting limb. Kinetic and postural tremors alone do not qualify for parkinsonism criteria.


REVIEW

CME

MDS Clinical Diagnostic Criteria for Parkinson's Disease

Ronald B. Postuma, MD, MSc,[1†*] Daniela Berg, MD,[2†*] Matthew Stern, MD,[3] Werner Poewe, MD,[4]
C. Warren Olanow, MD, FRCPC,[5] Wolfgang Oertel, MD,[6] José Obeso, MD, PhD,[7] Kenneth Marek, MD,[8] Irene Litvan, MD,[9]
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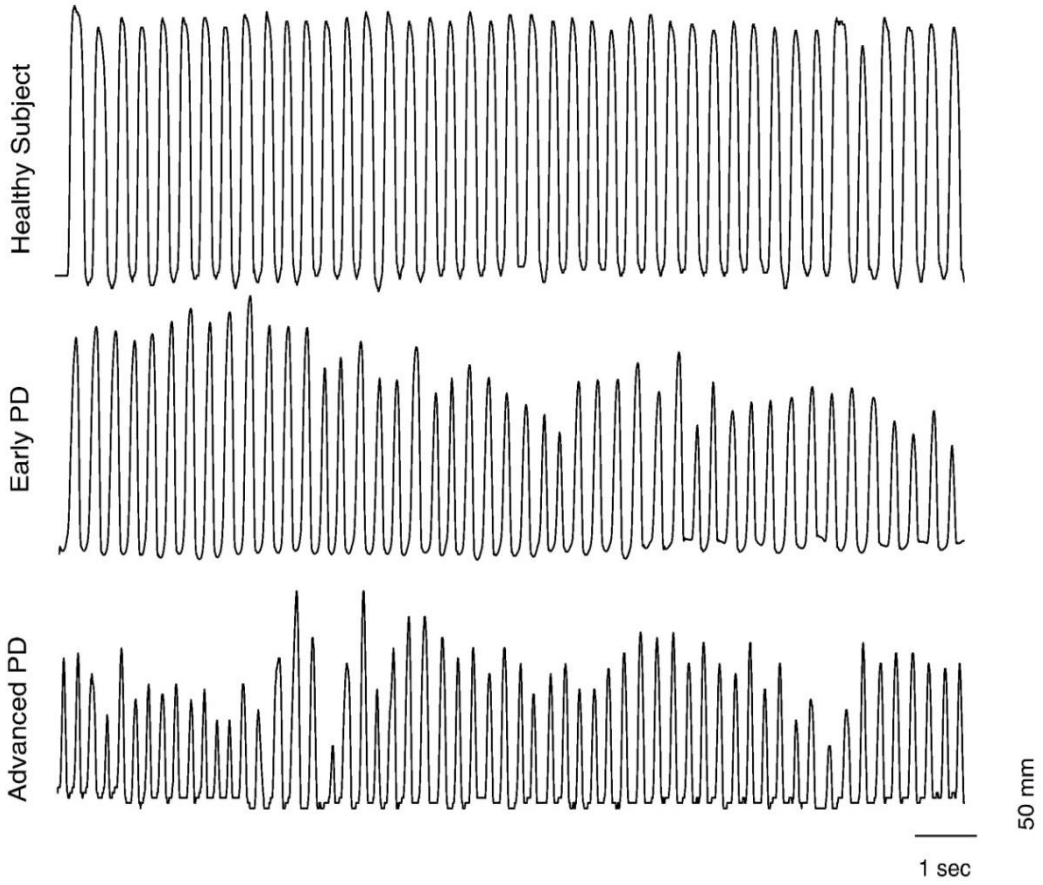
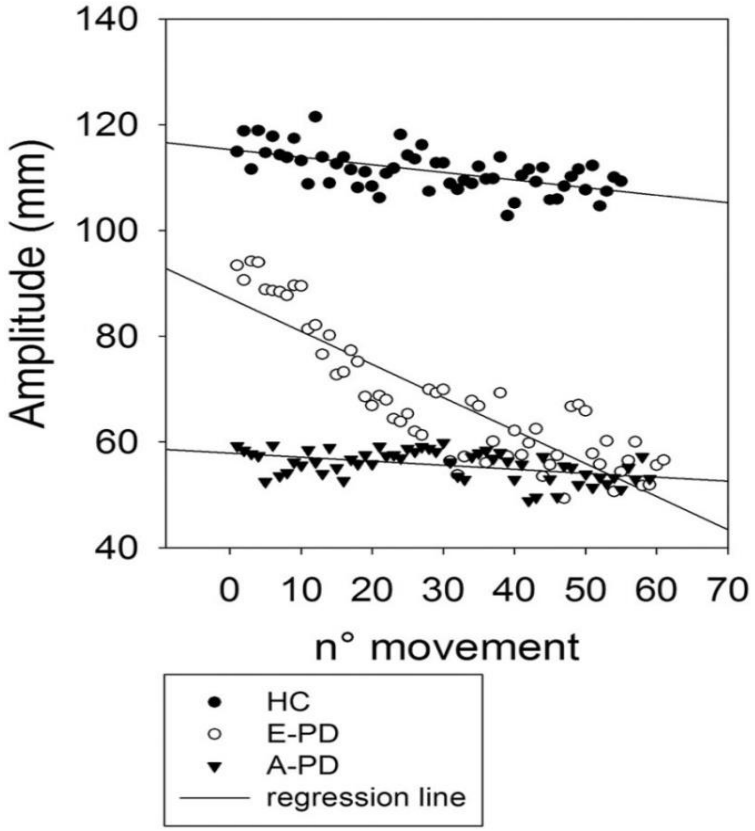
Bruno Dubois, MD, PhD,[14] Piu Chan, MD, PhD,[15] Bastiaan R. Bloem, MD, PhD,[16] Charles H. Adler, MD, PhD,[17]

Assessing bradykinesia with cynematic analysis





Bologna et al., J Neurol Sci 2016

Features of tremor in PD

1. Rest tremor must be present
2. Re-emergent tremor is a form of rest tremor
3. Postural and kinetic tremor can be present but only when rest tremor is also present
4. Different type of tremors may differ in pathophysiology, clinical impact and response to treatment

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Editor's Comment: Tremor, arguably the cardinal sign of Parkinson's disease, remains fairly enigmatic in terms of its pathophysiology. From the group of Berardelli, a group of 210 patients with PD were consecutively assessed for the presence of re-emergent tremor (RET). This was present in about 20 % of the sample, and was unilateral in half of those. No patient had a history of familial tremor.
The principal finding of this study is that disease severity was milder in patients with RET. It is well known that disease severity is less in patients with tremor predominant PD, but the authors further demonstrated that patients with RET had milder disease as compared to those with action tremor. This report appears to confirm Jankovic's original postulate that RET is a form of rest tremor. All in all, this interesting article underscores how careful clinical observations may lead to interesting hypotheses and potentially illuminate basic disease processes.

Jonathan Carr, Associate Editor, University of Stellenbosch, Ward A-8-L, Tygerberg Hospital, Tygerberg, Western Cape, 7075, South Africa.

Re-emergent tremor in Parkinson's disease

Daniele Belvisi [a], Antonella Conte [a, b], Matteo Bologna [a, b], Maria Carmela Bloise [b], Antonio Suppa [a, b], Alessandra Formica [a], Matteo Costanzo [b], Pierluigi Cardone [b], Giovanni Fabbrini [a, b], Alfredo Berardelli [a, b, *]

European Journal of Neurology 2018, **25:** 799–804

CME ARTICLE

Re-emergent tremor in Parkinson's disease: the effect of dopaminergic treatment

D. Belvisi[a], A. Conte[a,b], C. Cutrona[b], M. Costanzo[b], G. Ferrazzano[a], G. Fabbrini[a,b] and A. Berardelli[a,b]

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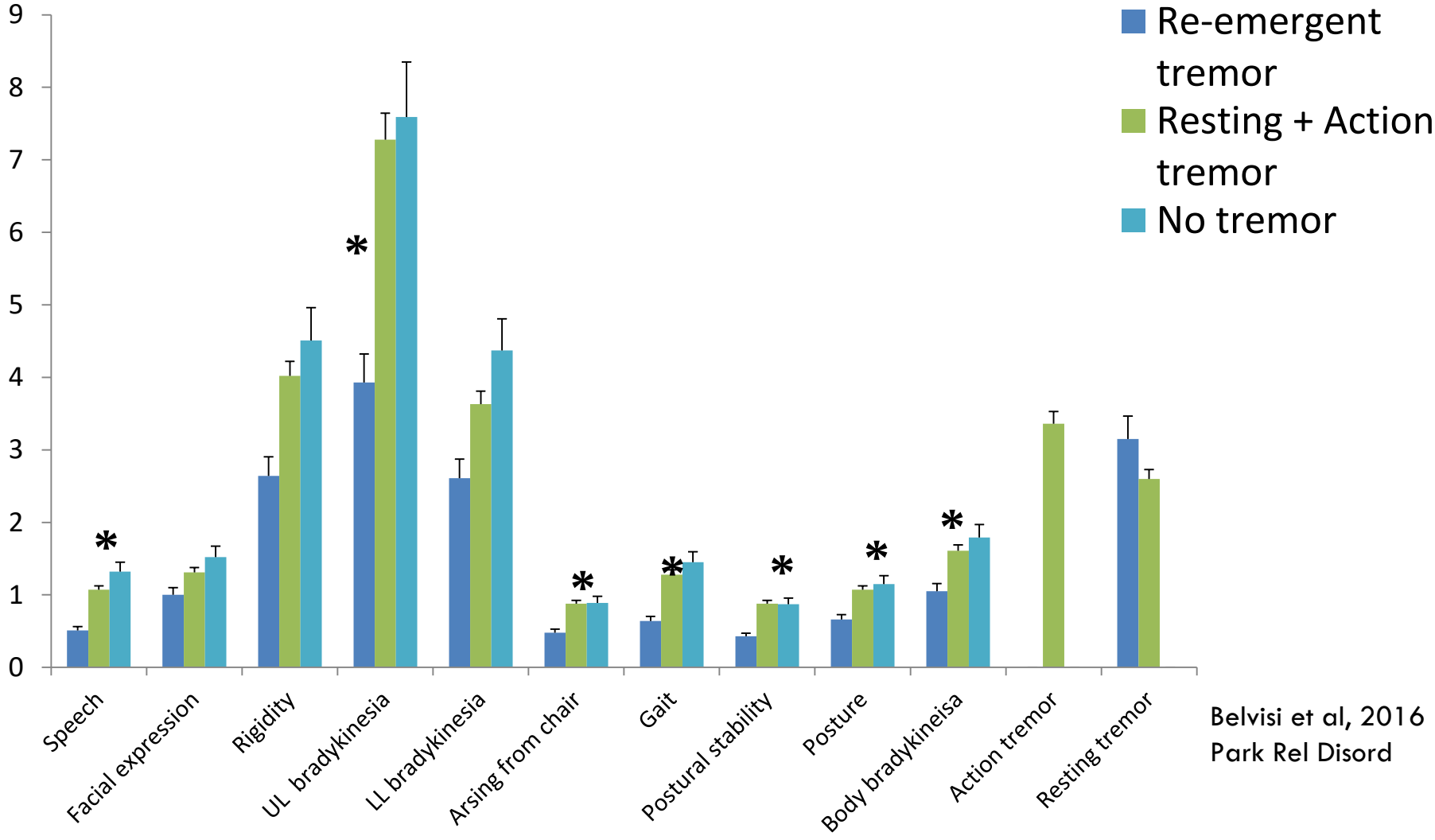
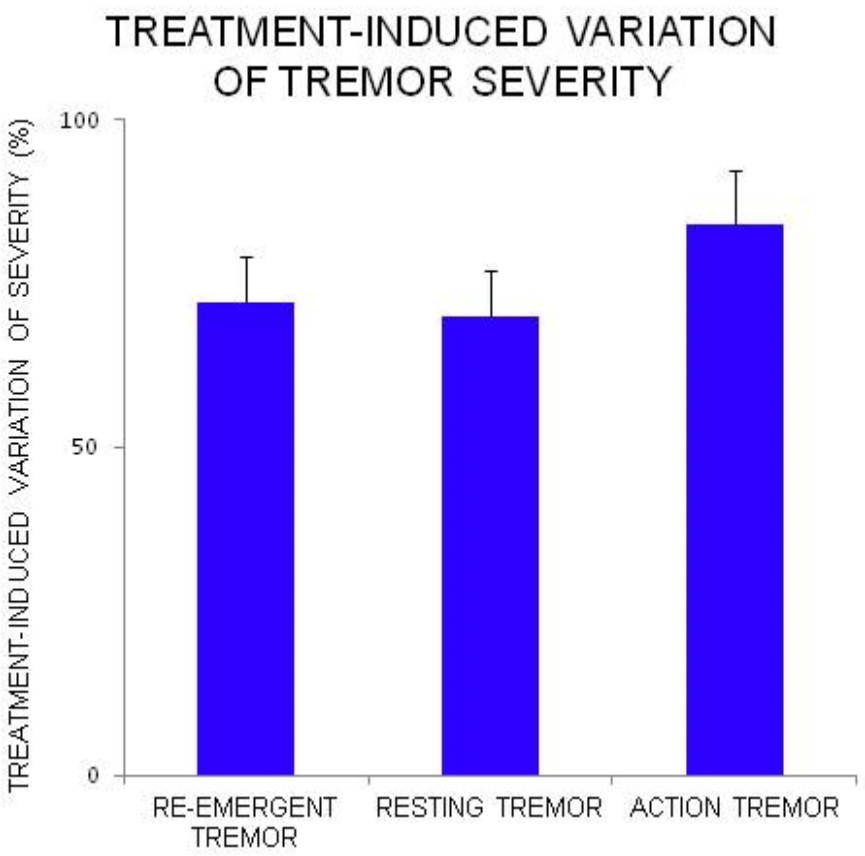
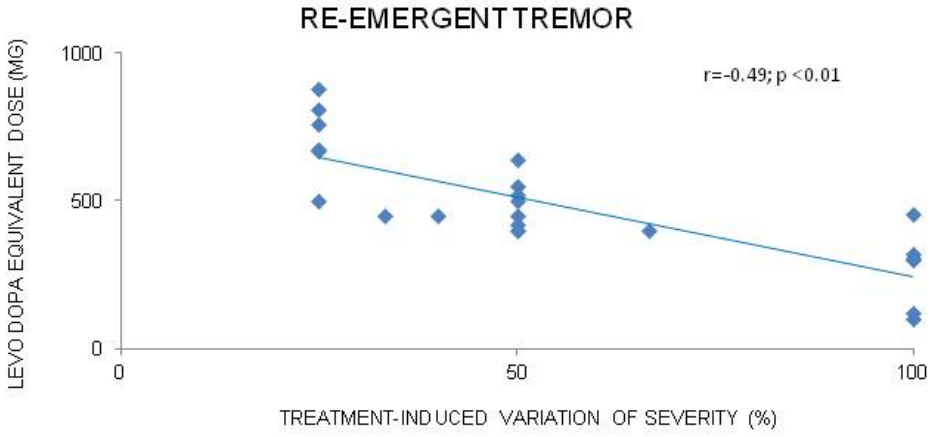
MDS-UPDRS scores in PD tremor subtypes



Belvisi et al, 2016
Park Rel Disord

Response to dopaminergic therapy in different types of tremor in PD





Parkinson disease: absolute exclusion criteria

- Cerebellar signs
- Downward vertical supranuclear gaze palsy or selective slowing
- Diagnosis of probable behavioural variant fronto-temporal dementia or primary progressive aphasia
- Parkinsonism restricted to lower limbs
- Possible drug-induced parkinsonism
- Absence of response to high-dose levodopa despite at least moderate severity of disease
- Presence of cortical sensory loss, apraxia or aphasia
- Normal functional neuroimaging
- Alternative condition known to produce parkinsonism

Parkinson disease: red flags

- Rapid progression of gait impairment
- A complete absence of progression
- Early bulbar dysfunction
- Inspiratory respiratory dysfunction
- Severe autonomic failure in the first 5y of disease
- Recurrent falls because of impaired balance within 3 y of onset
- Dysproportionate anterocollis
- Absence of any of the common nonmotor features of disease despite 5 y disease duration
- Unexplained pyramidal tract signs
- Bilateral parkinsonism during the disease course

Multiple system atrophy (MSA)

- Subtypes
  - Parkinsonian
  - Cerebellar
  - Autonomic
- Clinical features
  - Parkinsonism
  - Cerebellar ataxia
  - Autonomic
    - Cardiovascular
    - Genito-urinary
    - Gastrointestinal

Gilman et al,

Multiple System Atrophy

- Parkinsonism
  - May be asymmetric
  - No Rest tremor
  - Early gait disorder
  - ± Levodopa response
- Cerebellar signs
  - Gait disorder
  - Limb ataxia
  - Nystagmus
- Other motor
  - Hyper-reflexia
  - Antecollis
  - Spastic dysarthria
  - Bulbar dysfunction
  - Limb dystonia
- Autonomic
  - Orthostatic ↓ BP
  - Sexual dysfunction
  - Incontinence

Gilman et al,

PSP clinical criteria of the MDS: Core clinical features

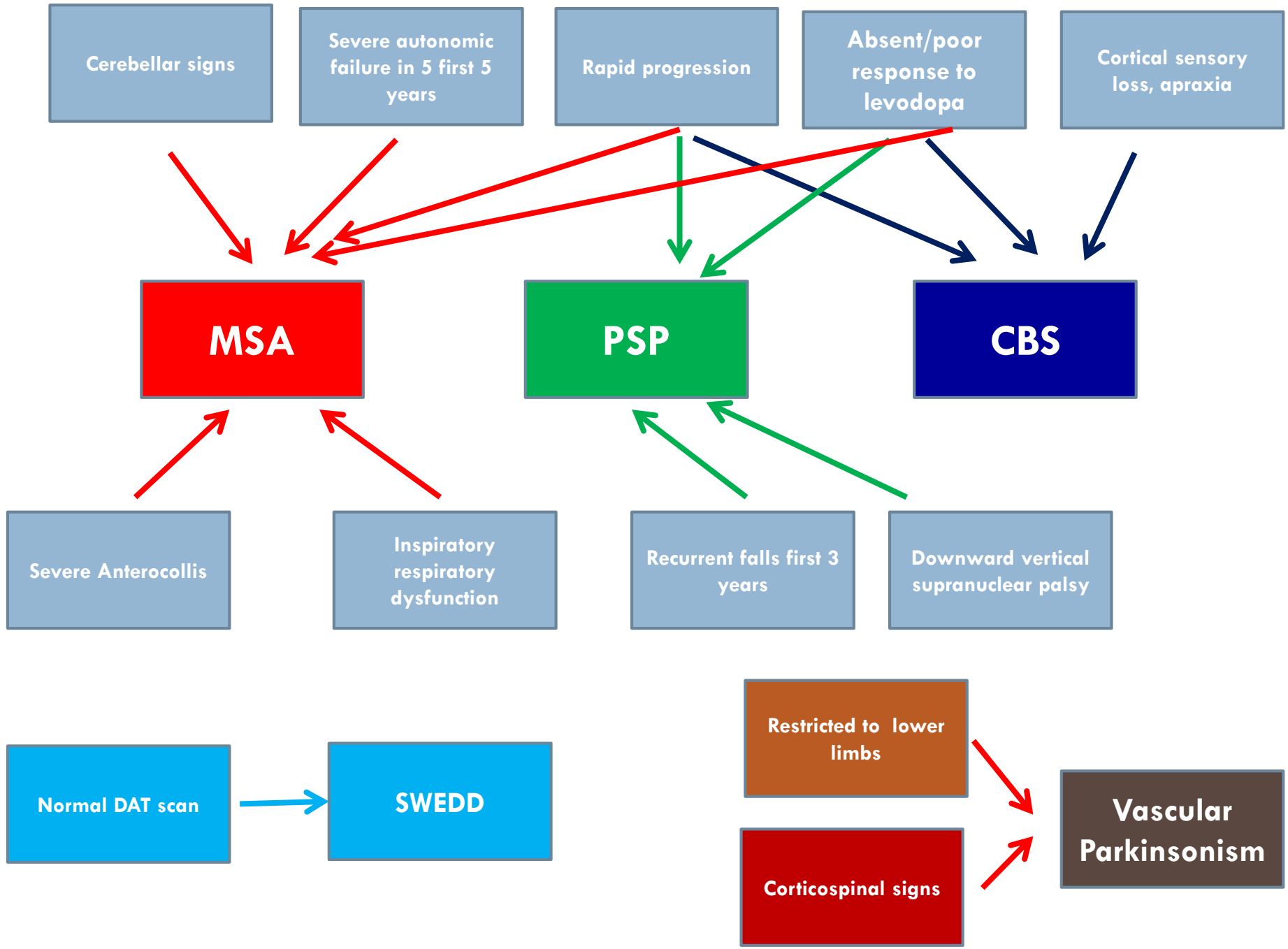
	Ocular motor dysfunction	Postural instability	Akinesia	Cognitive dysfunction
High likelihood of diagnosis	vertical supranuclear gaze palsy	unprovoked falls within 3 years from onset	progressive gait freezing within 3 years from onset	speech/language disorders
Medium likelihood of diagnosis	slow velocity of vertical saccades	tendency to fall (pull test) within 3 years from onset	levodopa resistant parkinsonism, predominantly axial, akinetic-rigid	frontal cognitive/behavioral symptoms early in the disease course
Low likelihood of diagnosis	macrowave jerks; eyelid opening apraxia	> than two steps backwards (pull test) within 3 years from onset	parkinsonism, possibly levodopa responsive, with tremor, possibly asymmetric	corticobasal syndrome

Hoglinger 2018

Clinical criteria for the diagnosis of corticobasal degeneration

Diagnostic level	
Definite	Pathological confirmation
Probable	2 of 3 required in one limb, must be asymmetric A. rigidity or akinesia B. dystonia C. myoclonus and at least 2 of these features A. limb apraxia B. cortical sensory deficit C. Alien limb
Possible	1 of 3 required in one limb, must be asymmetric A. rigidity or akinesia B. dystonia C. myoclonus and at least 1 of these features A. Limb apraxia B. Cortical sensory deficit C. Alien limb

Armstrong 2014


Cerebellar signs
Severe autonomic failure in 5 first 5 years
Rapid progression
Absent/poor response to levodopa
Cortical sensory loss, apraxia
MSA
PSP
CBS
Severe Anterocollis
Inspiratory respiratory dysfunction
Recurrent falls first 3 years
Downward vertical supranuclear palsy
Normal DAT scan
SWEDD
Restricted to lower limbs
Corticospinal signs
Vascular Parkinsonism

What about….

- Subtyping PD
- Dementia in PD: does LBD exist?
- Atypical-atypical parkinsonism:
  - Potentially treatable atypical parkinsonisms (example, adult-onset Nieman Pick, Wilson disease, other rarer conditions)