

Relationship between bradykinesia and cognitive functions in patients with essential tremor

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Introduction: Bradykinesia in essential tremor (ET) is one of the so-called ‘soft signs’ configuring the diagnosis of ET-plus [1-2-3]. Cognitive disturbances may also occur in ET with a higher prevalence than in the general population [1]. Though it has been demonstrated that soft signs often occur in combination, the relationship between bradykinesia and cognitive dysfunction in ET patients has never been explored [4].

Aims: To further investigate the association between bradykinesia, as objectively assessed with kinematic analysis, and cognitive functions in ET.

Methods: 45 ET patients (23 F, mean age: 66.48±13.69) underwent kinematic recordings of finger-tapping movements with an optoelectronic motion system. A comprehensive cognitive evaluation, including the assessment of executive and visuo-constructional functions, attention, and memory, was also performed on participants. Automatized algorithms were used for kinematic analysis, providing objective measurement of movement velocity and movement rhythm (expressed as coefficient of variation - CV, with higher values indicating a more irregular rhythm). Possible associations between kinematics and raw cognitive scores were assessed by using the Pearson correlation coefficient.

Results: We found a positive correlation between movement velocity and the Rey-Auditory Verbal Learning Test (RAVLT) immediate and delayed recall ($r=0.3$, $p=0.04$ and $r=0.35$, $p=0.019$, respectively). A negative association was found between CV and Forward Digit span scores ($r=-0.3$, $p=0.039$). Finally, CV values positively correlated with the Modified Card Sorting Test (MCST) errors ($r=0.43$, $p=0.024$). These results overall indicate that the lower the movement velocity and the more irregular the rhythm, the worse the performance on tests exploring memory and executive functions.

Conclusions: We here demonstrated a relationship between finger-tapping bradykinesia and memory and executive dysfunctions in ET. Our results are relevant for a better understanding of ET and ET-plus pathophysiology.

Bibliography:

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