Visuospatial deficits are associated with Pisa syndrome but not with camptocormia in Parkinson disease

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Introduction: Pisa syndrome and camptocormia are frequent postural abnormalities (PA) associated with Parkinson disease (PD). Their pathophysiology remains largely unclear, although some small-sampled pilot studies suggest a role for cognitive deficits.

Objective: To assess the potential contribution of cognitive deficits in determining PA in patients with PD.

Methods: We performed a multicenter, case-control study to analyze the cognitive profile of PD patients with either Pisa syndrome or camptocormia as compared to matched PD patients without PA. A total of 114 PD patients from seven Italian and one German centers were enrolled: 32 with Pisa syndrome (PS+) and 25 with camptocormia (CC+) were matched - for gender, age, education, PD duration, and PD stage – with 57 patients without PA (32 PS-, and 25 CC-). Patients underwent an extensive clinical and neuropsychological assessment, evaluating five cognitive domains: memory, attention, executive functions, visuospatial abilities, language. Z-scores of each test were used to estimate a cognitive domain score, which was compared for PS+ vs PS- and CC+ vs CC- using the Mann-Whitney test.

Results: All groups were comparable for the main demographic and clinical features. PS+ showed significantly worse visuospatial performances than PS- (Z-score PS+ -1 ± 1.1; PS- 0.5 ± 0.9; p:0.025), while CC+ did not show any significant differences when compared to CC-. The global cognitive score, assessed by MoCA, did not significantly differ between groups, nor did the other cognitive domains scores.

Conclusion: Our findings confirm, with an adequate sample size and methodology, preliminary data on the association of worse visuospatial abilities in patients with PS compared with patients differing only for the absence of PA. However, we did not observe the same association for CC patients. These

results indicate different pathophysiological trajectories between PS and CC, suggesting a specific role of visuospatial deficits in the development of PS but not of CC.