Parkinson's disease and atypical parkinsonisms: nutritional status, sarcopenia and cognitive functions, what correlation?

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BACKGROUND: In Parkinson's disease (PD) and atypical parkinsonisms (PKS) changes in nutritional status are observed throughout the duration of the disease, with consequent body weight and muscle mass loss, and possible onset of sarcopenia. The objective of this study was to verify how nutritional status and body composition are associated with cognitive functions.

MATERIALS AND METHODS: We enrolled patients with PD or atypical PKS (MSA,PSP and LBD), aged 60 years and over, hospitalized in the Department of Neurology of Asst-Pini-Cto (Milan). We evaluated: anthropometric parameters (weight, height, circumferences, bioimpedance analysis), routine blood tests, nutritional risk and swallowing disturbances (MUST, MNA, SDQ, EAT-10), disease duration, UPDRS, H&Y scale, drug therapy, global cognition tests (MMSE, MoCA). The diagnosis of sarcopenia was conducted according to EWGSOP2 criteria, based on handgrip strength test (HGS), skeletal muscle index (SMI) and 4-meter gait speed test (GST).

RESULTS: We enrolled 150 patients, 103 PD and 47 atypical PKS, 91 men and 59 women (mean age, 69 years, DS±6.4). All patients received levodopa therapy upon enrollment. Mean BMI was 26.2 kg/m2 in women and 27.4 kg/m2 in men; 4.7% of patients presented underweight, 34.7% normal weight, 38.7% overweight, 22% obesity. Low HGS was found in in 62.7% of women and 71.4 % of men, low SMI in 35.2% of women and 35.6 % of men. The evaluation of severe sarcopenia was rendered inaccurate by the influence of motor symptoms on GST. Using general linear models to test the association between BMI class, SMI, sarcopenia and HGS with MMSE and MoCA, a significant correlation was found between low HGS and MMSE and MOCA (corrected for age and schooling) (respectively P=0.005 and P=0.02) (fig. 1 e 2). To investigate how the three variables necessary for the diagnosis of sarcopenia can affect cognitive status, we proceeded with a multiple regression analysis between the three parameters and the neuropsychological tests MMSE and MoCA. Also from this analysis, it is found that the HGS test is the parameter that most influences cognitive status, when all the parameters mentioned are taken into consideration (fig. 3 e 4).
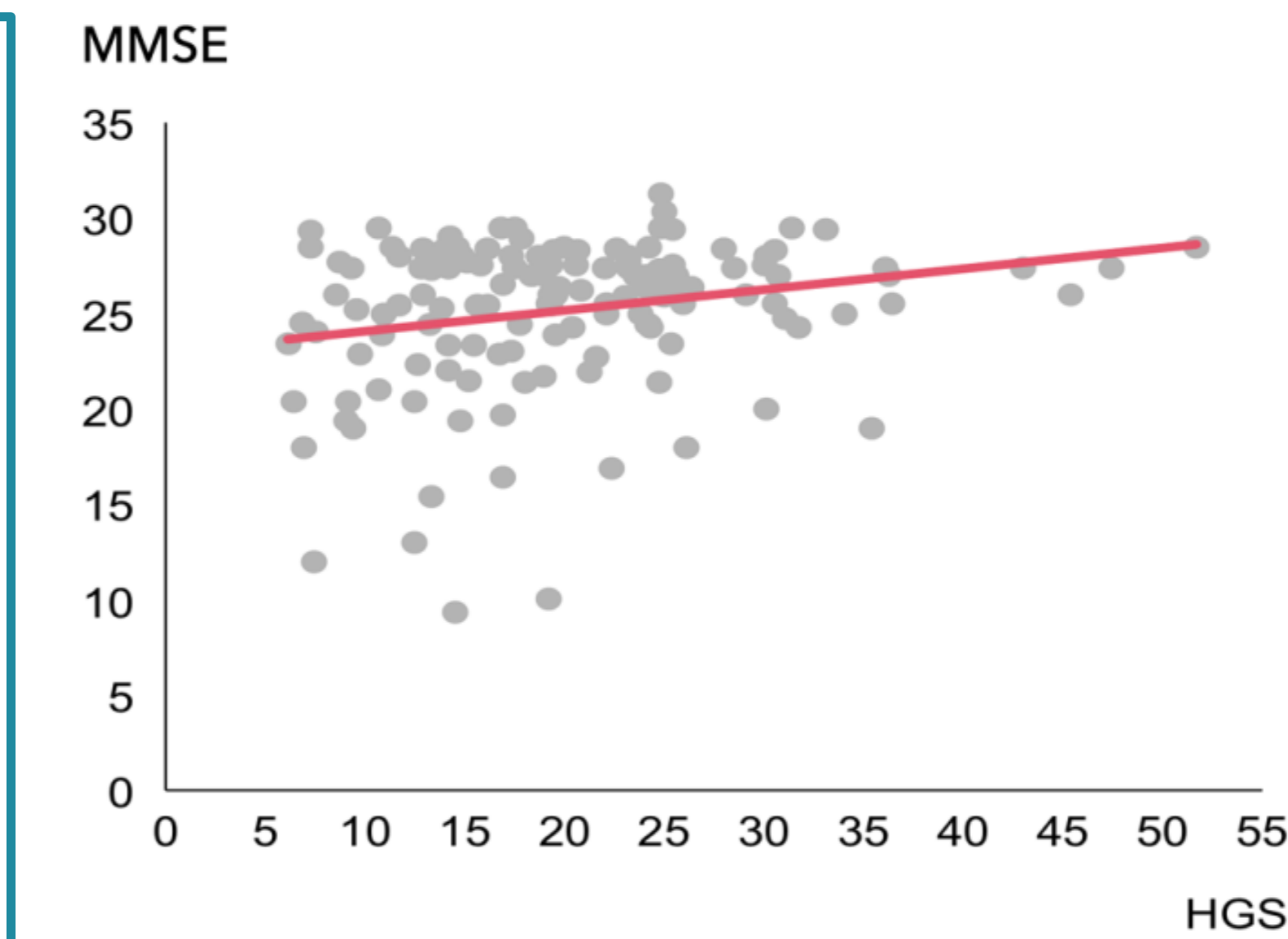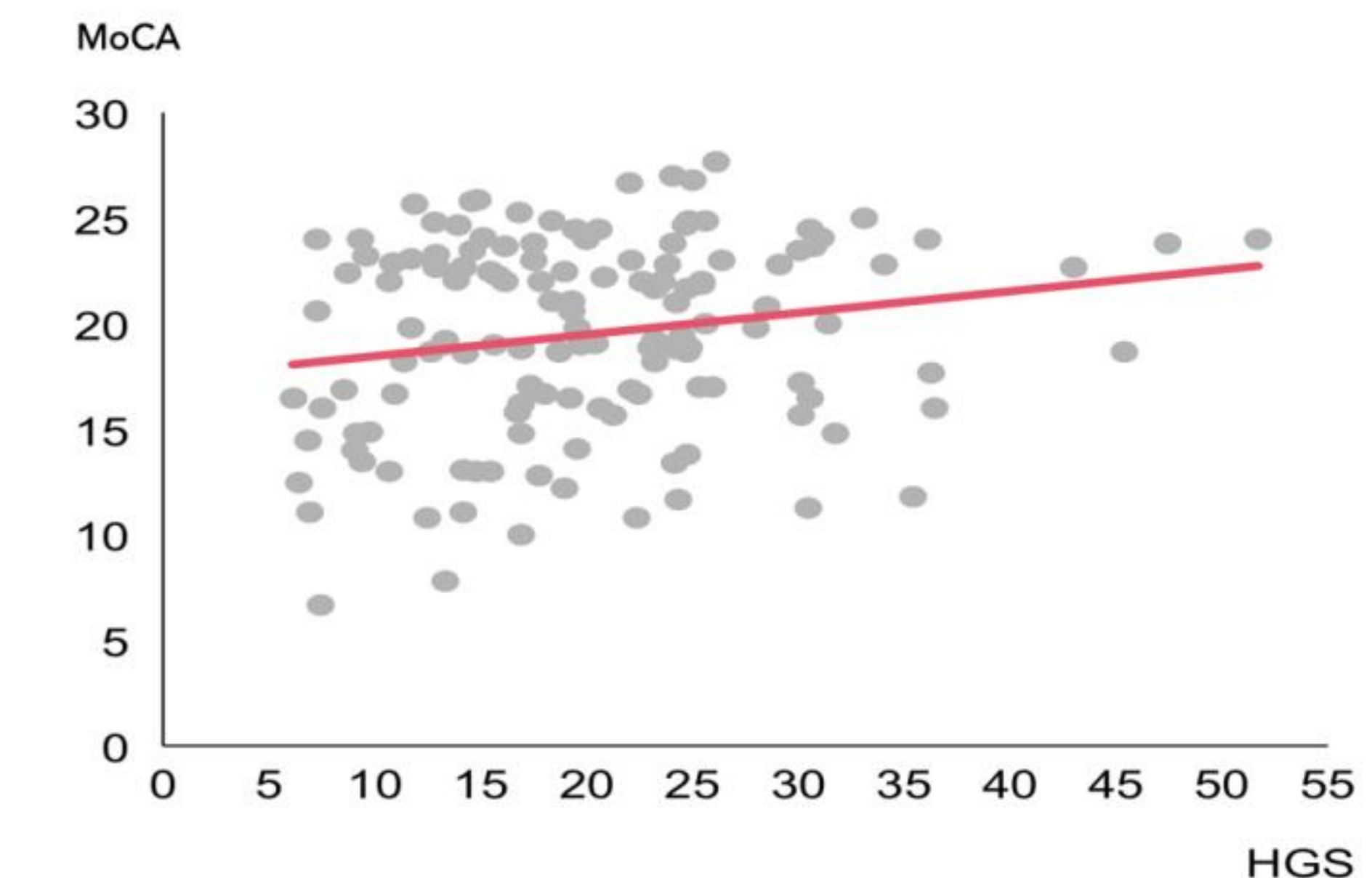

Fig. 1 - MMSE and HGS correlation

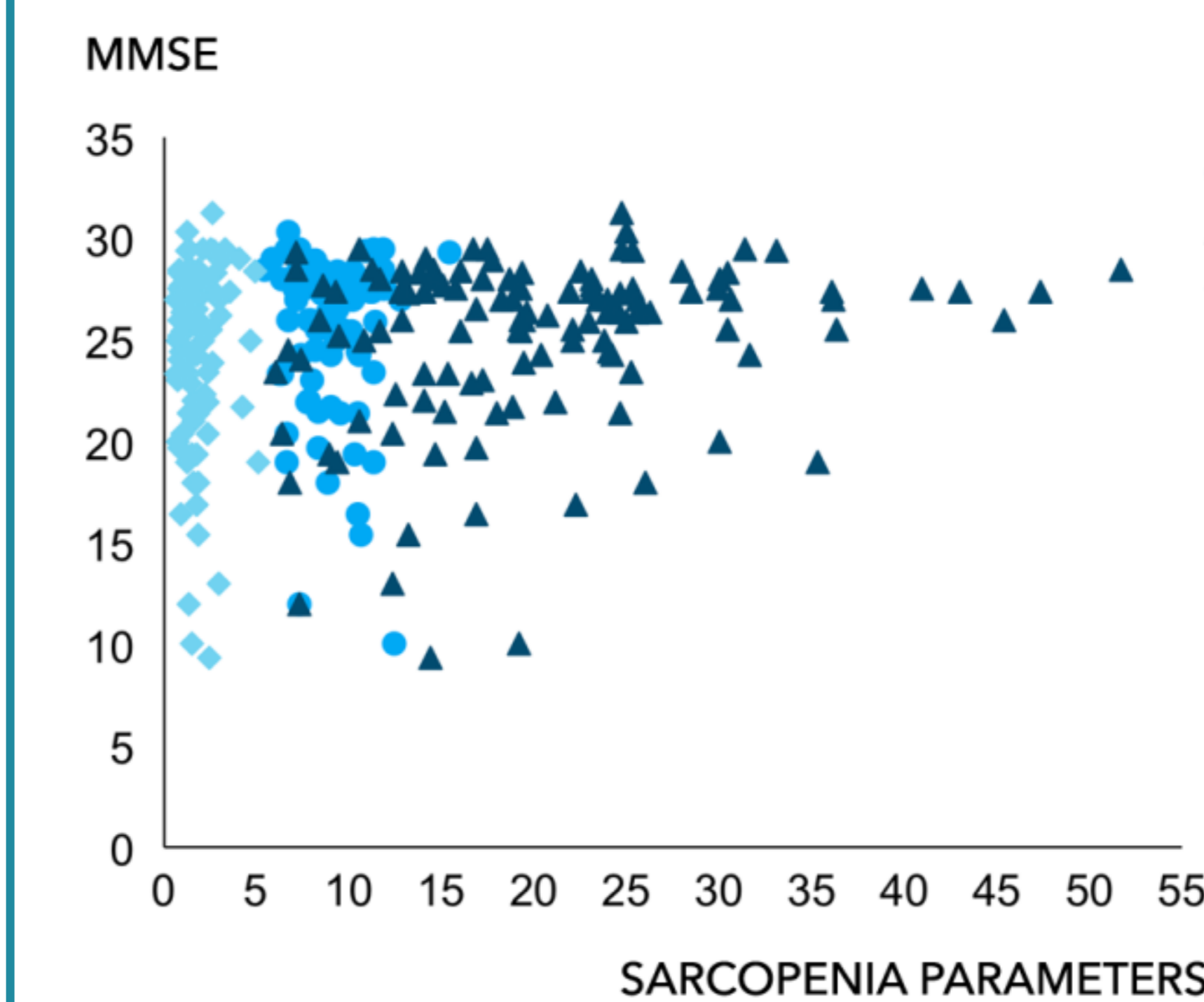Fig. 2 - MoCA and HGS correlation

Fig. 3 - Multivariate analysis for correlation between diagnostic parameters of sarcopenia and MMSE
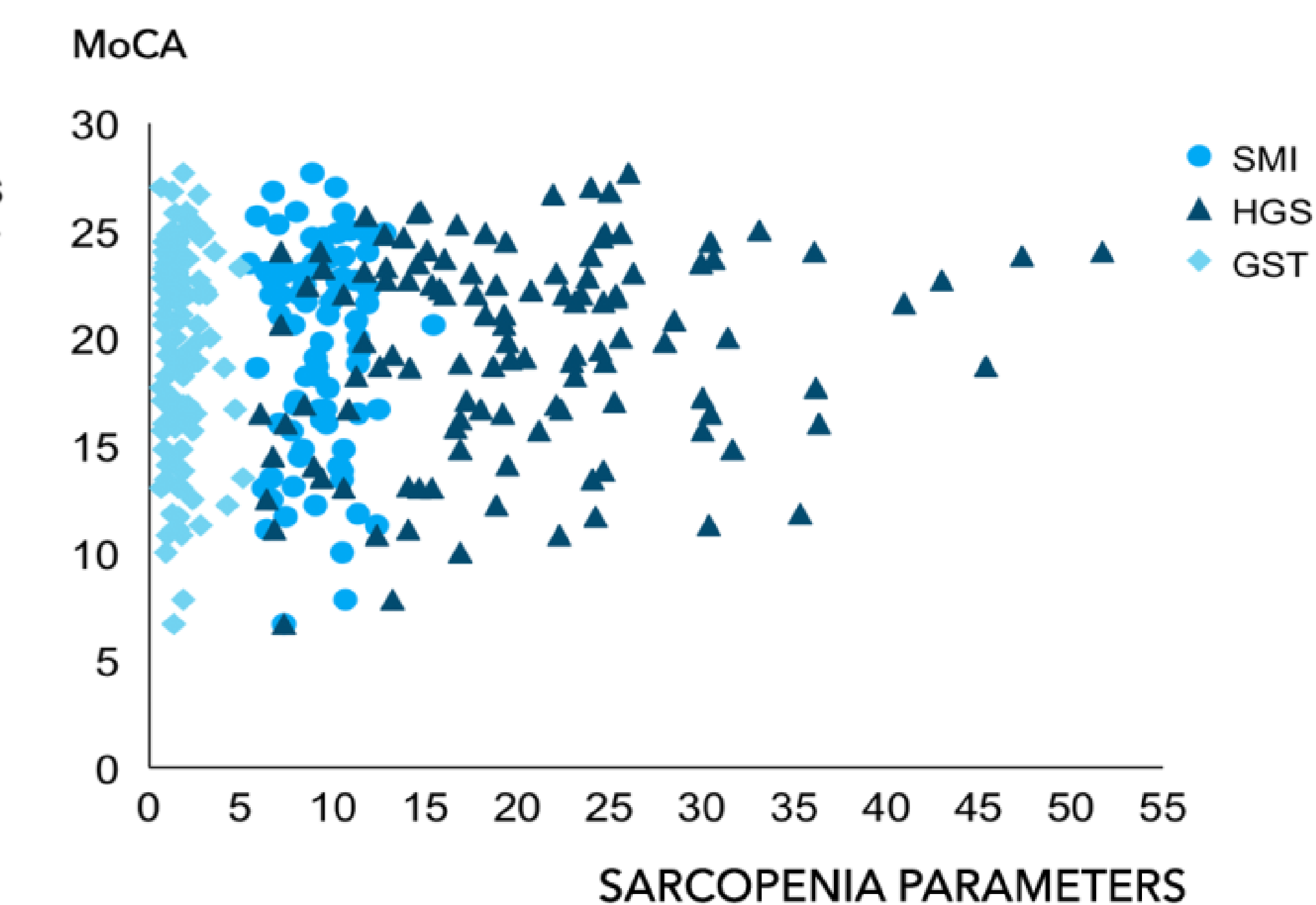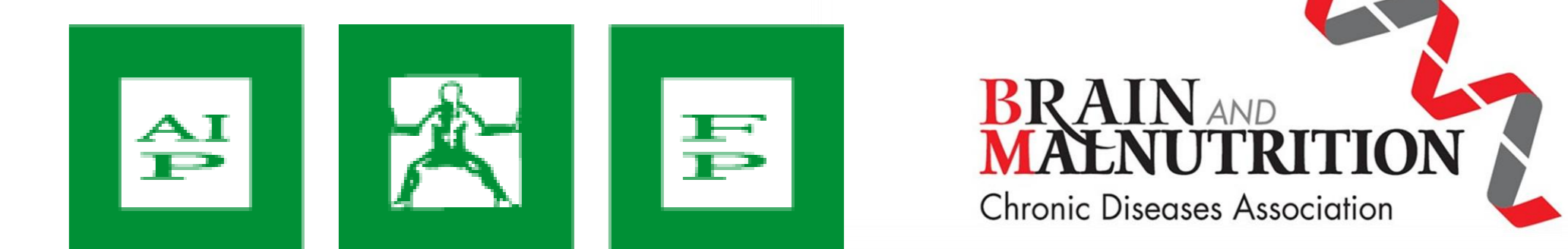

Fig. 4 - Multivariate analysis for correlation between diagnostic parameters of sarcopenia and MoCA

CONCLUSION: HGS shows a widespread reduction in strength and is one of the indicators for the diagnosis of sarcopenia. In this preliminary group of enrolled PD patients, we found a statistically significant correlation between the decrease of HGS and the neuropsychological tests MMSE and MoCA. At the moment no statistically significant correlation has been found between neuropsychological tests and other nutritional parameters. Other investigations in larger populations are needed.