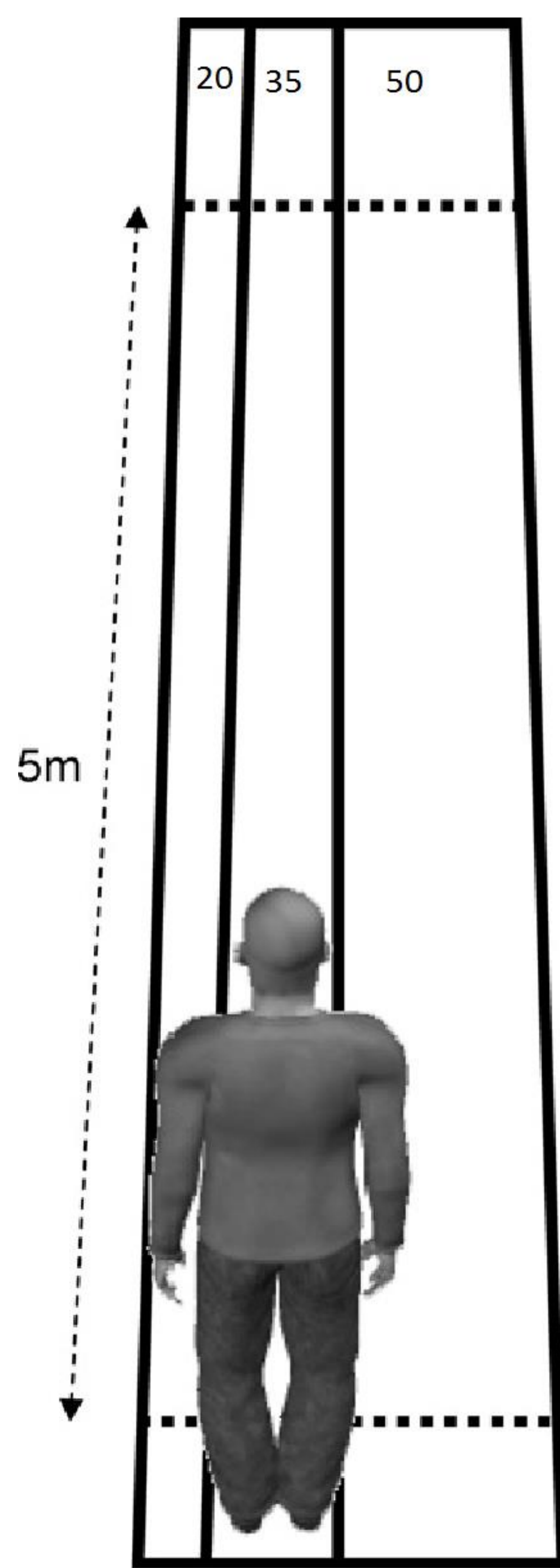


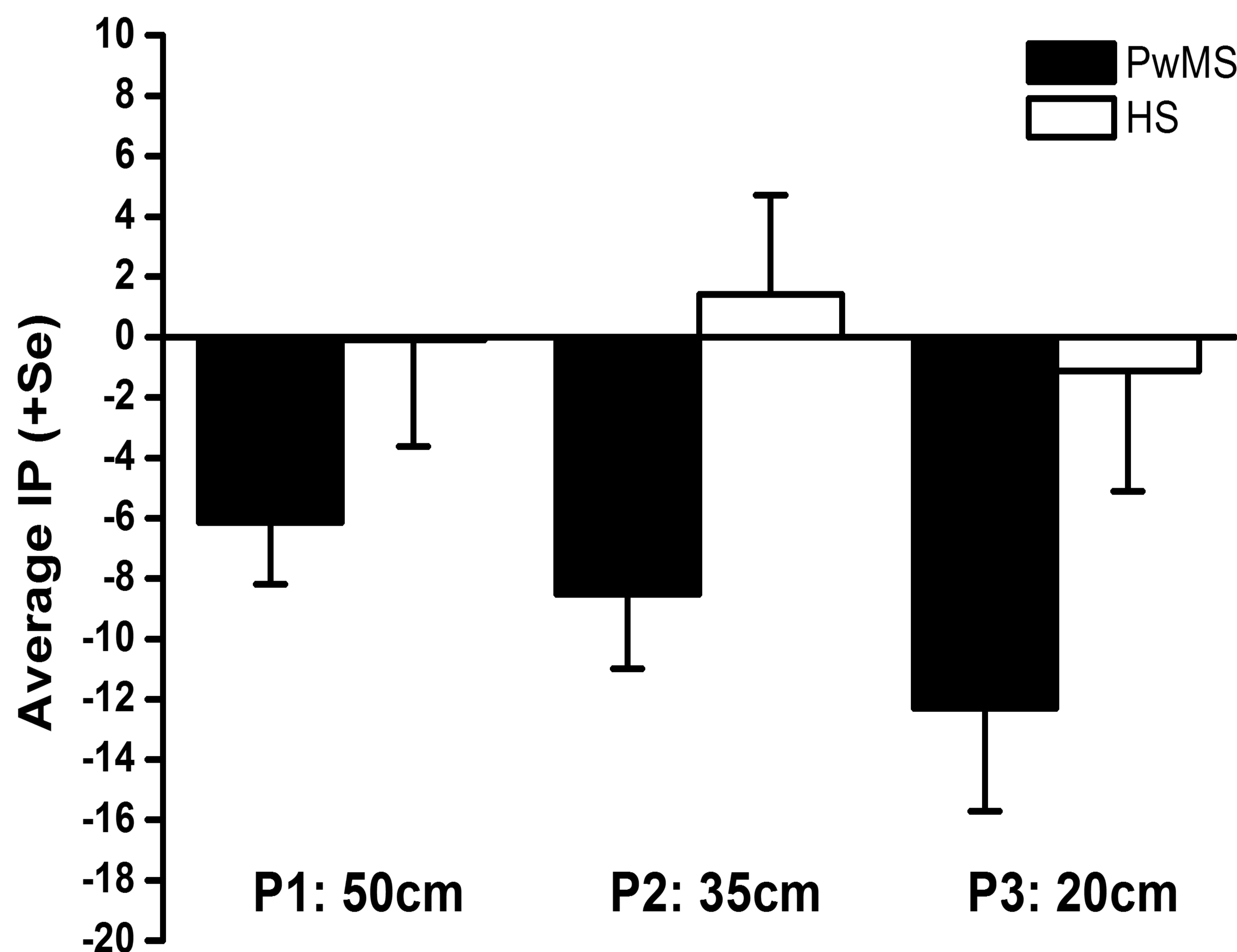
INTRODUCTION: In the last years many evidences on motor imagery (MI) properties in healthy subjects demonstrated an age-related temporal relationship between mental and actual movement durations. Skoura et al. (2008) showed that isochrony is preserved in middle-aged adults while aging seems at the origin of a temporal discrepancies (anisochrony). Also, by comparing several studies, similarities related to the cognitive decline emerge between elderly subjects and patients with Multiple Sclerosis (PwMS), especially in information processing, memory and attention deficits. Nevertheless, it is still unclear if MI isochrony is preserved in PwMS and, otherwise, if their MI properties matched with elderly subjects.

OBJECTIVES: Here, we evaluated abilities to perform MI in PwMS with a low disability level by comparing temporal features of actual and mental actions during a locomotion task. MI was evaluated following the protocol adopted by Personnier et al. (2010).

MATERIALS AND METHODS: Six PwMS (mean age 32.4±2.1 years; mean EDSS 2.14) and six healthy age-matched subjects (HS, mean age 28.0±1.9 years) were recruited after obtaining a KVIQ positive score. Three paths (walking distance, 5m) were drawn on the ground and their width constraints (20, 35 and 50cm) determined different levels of accuracy, equilibrium and cognitive resources. Participants had to physically or mentally walk through each path at their natural speed. MI was performed in a first person perspective and vision was allowed to facilitate the path visualization. Participants performed 12 trials for each of the six randomly presented conditions. Executed and imagined durations (DE, DI) were recorded with an electronic stopwatch that was opportunely started and stopped by the experimenter. MI performances were calculated by an index of performance as $IP = ((DE - DI) / DE) \times 100$.



RESULTS: As expected from previous findings, statistical analysis showed that HS preserved isochrony whatever the path width. On the contrary, PwMS systematically overestimated the DI with respect DE, and similarly to the elderly subjects (Skoura et al., 2008) path width negatively influenced their MI performances.



CONCLUSIONS: Results suggest that decline in MI may reflect brain functional changes as expression of neurological deficits in PwMS. Moreover, MI behavior seems suggesting and supporting a similar cognitive decline pattern between PwMS and healthy elderly persons. However more accurate investigations are necessary.