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Effects of an individual 12 weeks community located running program on physical capacity, walking, cognitive function, dual tasking and brain volumes and structures in persons with Multiple Sclerosis

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Background: Motor and cognitive dysfunctions already occur at early disease stage. Previous exercise studies primarily focused on motor outcomes, while cognitive function or neural correlates were rarely addressed.

Objectives: This randomized-controlled study investigated the effects of a community based running training program on physical capacity, cognitive function, cognitive-motor interference, fatigue, quality of life and brain volume and structures.

Method: 42 PwMS able to walk but not run 5 kilometer without rest were included (EDSS < 4). They were randomized to either experimental either waiting list control group (WLC). The goalsetting was joint participation to a public 5km running event. Both groups received individualized running training program instructions during 12 weeks, to be performed 3x/week in their community. Measurements took place at baseline and after 12 weeks. The WLC received the training program after the 12 week period. Outcome measures were VO₂max, sit-to-stance test, 6MWT, MSWS-12, a comprehensive neuropsychological test battery, a cognitive-motor dual-task protocol, FSMC, MSIS-29 and neural imaging. Brain and grey matter volume were measured using FSL-SIENA and FSL-FIRST. DTI analysis was run using FSL-TBSS.

Results: In each group, 16 pwMS of 21 completed the trial. Significant interaction effects ($p < 0,05$) in favor of the experimental group were found for VO₂max, sit-to-stance test, MSWS-12, spatial recall test, dual task cost during walking while performing a phonemic word list generation test, FSMC physical and mental score and the MSIS-29. There were no significant changes for the 6MWT, the Buschke selecting reminder test and PASAT. The brain and grey matter volumes, and DTI analysis revealed no significant difference between groups or over 13 weeks.

Conclusion: 12 week community based running training in PwMS led to large and mild improvements in the motor and cognitive domain respectively however without significant brain volume and structures changes.

Disclosure: Nothing to disclose