Understanding how people with MS get tired while walking

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Background

Walking impairment is frequent, appears early in the disease course of MS patients, and is perceived as the most disabling symptom [1]. When walking, patients get tired more and differently than healthy people [2]. This limits their maximum walking distance. Understanding and monitoring this phenomenon is thus important in the clinical setting.

Objective

Our aim is to understand how MS patients get tired while walking compared to healthy people. Two groups of MS patients are considered: those with a low disability level (MSL) and those with a high one (MSH). We consider two criteria to measure the disability: • EDSS criterion and the deceleration index (DI) which compares the walking speed on the last 20% of a 500 m walk with the walking speed of a 25 ft walk [2].

Results

Both criteria for defining the groups lead to similar results. For many gait characteristics, the distributions of the variations are significantly different between MSL and MSH. The largest difference is for the relative difference of speed (p=0.000119 for EDSS and p=0.000021 for DI). In contrast, only the variation of the average lateral distance between the feet, which is related to the size of the base of support during walking (and thus to the balance), shows a very significant difference between healthy people and MSL (p=0.000116 for EDSS and p=0.000120 for DI). This gait characteristic does not seem to change much from MSL to MSH. Besides, we note that the variance decreases slightly from healthy people to MSL and increases a lot from MSL to MSH.

Conclusions

Statistically, from the motor fatigue point of view, it seems that the course of the MS disease is divided in two different stages. In the first one, MS patients get more tired than healthy people with a deterioration of the balance. Then, in the second one, their fatigue becomes related to a faster decrease of the walking speed. This suggests that physical therapy exercises focused on the balance could be given to MS patients in the early stage of the disease.

References


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Figure: The two stages of the disease’s course can be observed when the EDSS is considered as the criterion to distinguish the patients with a low disability level from those with a high disability level.