



Obstacle circumvention in people with Parkinson's disease

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Obstacle circumvention leads to reduced walking speed and step length in young adults compared to unobstructed walking. These adjustments are exacerbated in older adults who appear to increase personal space and further reduce walking speed compared to young adults in obstacle circumvention tasks while walking. These age-related impairments are likely related to deficits in selecting and processing environmental information. While these types of sensorimotor deficits are believed to underlie many of the gait abnormalities in people with Parkinson's disease (PD), obstacle circumvention has yet to be studied during walking in PD. Therefore, the aim of this study was to compare the motor strategies during obstacle circumvention while walking in patients with PD ($n=15$) to healthy age-matched control participants ($n=15$). Were made five trials of unobstructed and five with obstacle, in random order. The obstacle was a cylinder (diameter: 0.35m - height: 1.30m) positioned in the middle of the walkway. Participants self-selected the speed and the side to circumvent the obstacle. 8 cameras Vicon Bonita were used. For the unobstructed walking, trials have calculated the average of the three central steps. For circumvention trials were analyzed 5 steps: 3 before the circumvention: N-3; N-2; N-1 and two during the circumvention: N; N+1. The significance level was maintained at 0.05 and the spatial-temporal parameters were compared by two-way ANOVAs. PD group presented shorter step length ($F_{1,28}=13.63, p<0.001$) and slower step velocity ($F_{1,28}=7.52, p<0.01$) compared to control group. Both groups decreased step length ($F_{1,28}=18.68, p<0.001$) and step velocity ($F_{4,25}=26.27, p<0.001$) for all steps in obstacle circumvention compared to unobstructed ($p<0.05$). Both groups require adjustments in spatial-temporal parameters, from the beginning to the deviation. But the PD group uses a more cautious strategy, with smaller step and slower. Obstacle circumvention during walking was a challenging task for both, PD and CG, and care is needed so there are no collisions, which can lead to falls, especially in PD. Apoio FAPESP.

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