

Resource Summary Report

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unexpected perturbations while walking in virtual reality environment

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Protocol Information

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Summary: Walking perturbations are a well-established tool to study human performance of balance tasks. We aimed to characterize walking and balance reactions in adults with and without neurological disease. Participants walked on self-paced treadmill while being exposed to unexpected surface displacement Perturbations. these were introduced at different phases of the gait cycle, on both legs and in anterior-posterior or medio-lateral directions, in random order. Two types of perturbations were implemented: (1) medio-lateral platform perturbations were achieved by displacing the moving platform 15 cm, to the left or to the right, over 0.92 seconds. The platform held its new position for 30 seconds and then returned gradually to its original position over 3 seconds; (2) anterior-posterior treadmill belt perturbations were achieved by reducing the speed of one of the treadmill belts by 1.2 m/s with a deceleration of 5 m/s². Relevant gait phase, gait parameters of step length and width as well as walking speed were detected and calculated from force plate and markers data in the sagittal plane. Force plate data was filtered using a low-pass filter with cutoff frequency of 5Hz and a force threshold of 25N is used; no filters were applied to the marker data. The protocol has two steps: (1) self-pace learning and (2) walking with unexpected surface displacement perturbations.

Associated Publications: Rosenblum U, Kribus-Shmiel L, Zeilig G, Bahat Y, Kimel-Naor S, Melzer I, Plotnik M (2020) Novel methodology for assessing total recovery time in response to unexpected perturbations while walking. PLoS ONE 15(6): e0233510. doi: [10.1371/journal.pone.0233510](https://doi.org/10.1371/journal.pone.0233510)

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