

## **Adaptive Locomotor Training on an End-Effector Gait Robot. Evaluation of the ground reaction forces in different training conditions**

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Abstract - The main goal of robotic gait rehabilitation is the restoration of independent gait. To achieve this goal different and specific patterns have to be practiced intensively in order to stimulate the learning process of the central nervous system. The gait robot G-EO Systems was designed to allow the repetitive practice of floor walking, stair climbing and stair descending. A novel control strategy allows training in adaptive mode. The force interactions between the foot and the ground were analyzed on 8 healthy volunteers in three different conditions: real floor walking on a treadmill, floor walking on the gait robot in passive mode, floor walking on the gait robot in adaptive mode. The ground reaction forces were measured by a Computer Dyno Graphy (CDG) analysis system. The results show different intensities of the ground reaction force across all of the three conditions. The intensities of force interactions during the adaptive training mode are comparable to the real walking on the treadmill. Slight deviations still occur in regard to the timing pattern of the forces. The adaptive control strategy comes closer to the physiological swing phase than the passive mode and seems to be a promising option for the treatment of gait disorders.

Clinical trials will validate the efficacy of this new option in locomotor therapy on the patients.