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Spastic Cerebral Palsy (CP) is characterized by increased joint stiffness, caused by increased reflex activity, muscle tone and altered tissue properties. To gain objective quantification of the ankle neuromechanical parameters, instrumented assessment (IA) was used to discriminate between CP children and controls. The feet of 35 spastic CP children (11.1±3.3 yr, GMFCS 1-3) and 35 controls (10.2±2.7 yr) was fixated to a motor driven footplate. Two passive slow (5 °/s) and fast (100 °/s) ramp-and-hold rotations were applied in the sagittal plane around the ankle joint, at two different knee angles (20º and 70º). Ankle angle and EMG of the gastrocnemius (GAS), soleus (SOL) and tibialis anterior (TIB) were used to optimize a nonlinear neuromuscular model to match the measured ankle torque. Differences between CP and controls were assessed using non-parametric tests. In CP, stiffness was 1,7 times increased in SOL (p=0,04) and was 0.63 decreased in TIB (p=0.03). Reflex activity was 3.5 and 3.1 times increased in CP for SOL (p←0.01) and GAS (p←0.01) respectively. Background muscle activity was 1.7 times increased in SOL (p←0.01). Ratios between stiffness and reflex activity differed considerably between patients. The IA was able to discriminate between CP patients and controls. In CP, reflex and background muscle activity were found to be increased in the triceps muscles, which are often treated for spasticity. The differences in contribution of stiffness and involuntary muscle activation found between CP patients indicate that IA could contribute to patient specific treatment selection.

The relationship between asymmetries in reactive and anticipatory balance control in Parkinson's disease patients

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Background: Parkinson's disease (PD) patients show asymmetries in balance control during quiet stance and in response to perturbations (i.e., reactive balance control). Furthermore, PD patients show a reduced ability to anticipate self-induced disturbances.
Objective: To assess the relationship between asymmetries in reactive and

anticipatory balance control in PD patients.
Methods: 14 PD patients and 10 matched controls participated. Ground reaction forces and moments as well as body kinematics were recorded to estimate ankle torques and body center of mass excursions. Reactive balance control (RBC) was investigated by applying external platform and force perturbations and relating the response of the left and right ankle torque to the body sway angle at the excited frequencies. Anticipatory postural adjustments (APAs) were investigated by determining the increase in the left and right ankle torque just before the subjects released a force that they exerted with the hands against a force sensor at shoulder level. The symmetry ratio between the contribution of the left and right ankle was used to express the asymmetry in reactive (SR_{RBC}) and anticipatory (SR_{ABC}) balance control.
Results: PD patients were more asymmetric in anticipatory ($p = 0.026$) and reactive balance control ($p = 0.004$) compared to healthy subjects. SR_{RBC} was significantly ($p = 0.003$) related to SR_{ABC} in patients with PD.
Conclusions: Asymmetries in reactive and anticipatory balance control seemed to be of the same magnitude in PD patients. Future studies should investigate the influence of static balance control asymmetries on gait initiation and the quality of the step.