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The effects of an expected twofold perturbation on able-bodied gait: trunk flexion and uneven ground surface

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Highlights:

- More crouch lower-limbs and an early-skewed vertical GRF in able trunk-flexed gait
- Ground-related adjustments in gait kinematics and kinetics
- Distinct spatial and temporal strategies in response to a twofold gait perturbation
- Unchanged spatial parameters of able-bodied gait across uneven ground
- Greater contribution from gait kinematics and temporal parameters in uneven walking

Abstract

Background: Although alteration in trunk orientation and ground level potentially affects gait pattern individually, it is plausible to examine the interaction effects of such factors.

Objective: The interaction effects between trunk-flexed gait and uneven ground on able-bodied gait pattern.

Methods: For twelve able-bodied participants, we compared the adaptive mechanisms in kinematics, kinetics and spatial-temporal parameters of gait (STPG) with bent postures (30° and 50° of sagittal trunk flexion) across uneven surface (10-cm visible drop at the sight of the second ground contact) with that of upright posture on even ground surface.

Results: Significant between-posture changes on the uneven surface included a decreased peak ankle dorsiflexion angle and vertical ground reaction force (GRF) 2nd peak as trunk flexion increased. Moreover, significant between-ground surface changes for each individual gait posture were a decreased peak ankle dorsiflexion angle and ankle range of motion irrespective of trunk posture and a reduced trailing step duration and vertical GRF 2nd peak in upright walking. The spatial parameters of gait remained unchanged across uneven surface, but at the

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