Strategic Learning of Propulsive Forces During Walking in Young Unimpaired Adults
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Introduction: Pathologies, like stroke, can contribute to abnormal walking as seen by reductions in propulsive forces. Individuals post-stroke have a propulsive reserve, but a strategy to tap into this reserve is unknown. One option is the use of implicit learning using distorted visual feedback (DVF).

Objective: To test the effect of implicit learning, using DVF of propulsive forces during treadmill walking, to determine (1) the capacity to alter propulsion, and (2) the biomechanical mechanisms underlying any alterations in propulsion.

Methods: The participants walked for 3 minutes (baseline) on the treadmill. Participants then completed 3 visual feedback conditions (control, 10% DVF, 20% DVF). The visual feedback indicated the participant's peak propulsion. For the 10DVF and 20DVF conditions, a multiplier gradually decreased the feedback without the participants' knowledge. Participants were instructed to achieve as many steps as close to their baseline average as possible, staying in between the SD bounds.

Results: A main effect of condition was observed for peak propulsion, such that participants used a greater propulsive force in the 20 DVF and 10 DVF conditions compared to the control. In regards to the biomechanical mechanisms that produced this change in propulsion, the TLA was significantly greater for the 20 DVF and the 10 DVF conditions in comparison to the control. Additionally, a positive correlation was observed between the change in peak propulsive force and the change in TLA.

Conclusion: Propulsive force can be increased through implicit learning with the use of DVF in young unimpaired individuals. This gives promise for translation into clinical populations like individuals post-stroke who will have deficits in propulsive forces.