ORAL: REPURPUSING MTRIGGER, A PORTABLE EMG BIOFEEDBACK DEVICE, FOR APPLICATION IN GAIT REHABILITATION, A MOTOR LEARNING APPROACH

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Objective: To repurpose mTrigger, a portable, cost-effective Electromyography Biofeedback (EMG-BFB) device for athletes, for application in gait rehabilitation in a variety of populations across the lifespan. Method: mTrigger provides visual EMG biofeedback via a cellphone app through Bluetooth connection when subjects meet set muscle activation goals, but visual feedback is not suitable for walking. A) Addition of auditory feedback allows mTrigger to be utilized while walking naturally without compromising or significantly changing gait. Additionally, incorporating haptic feedback, makes utilization of this device suitable for older population that may be hard of hearing. B) Addition of average peak EMG activity calculator to determine subjects' baseline and set EMG activations goals above that. Specifically, because EMG measures can change over time, based on sensor placement, or change in impedance, or muscle spasticity this allows an accurate baseline to be determined at each single session and activation goals set by clinician or patient. C) Addition of compliance (number of steps when subjects meet increased activation goal/number of all steps). Addition of compliance allows
several unique opportunities: 1- Provides a measure of performance (ranging from 0-100) for both patient and clinician. 2- Allows optimization of functional difficulty to create challenge points and induce learning 3- Allows feedback in form of knowledge of result and knowledge of performance. D) Cloud Integration: This feature makes it suitable for home-based training application and provides longitudinal data that can be used to track and conduct clinical interventions remotely. Implications: Major implications of this work is the potential to change the current treatment of gait rehabilitation by addition of an EMG-BFB paradigm with positive reinforcement learning that can be utilized outside the controlled lab environment in adults and children with pathological gait.