muscles are activated independently of the different focal arm perturbations in healthy subjects. In LBP subjects, a motor control deficit has been implicated by this loss of independent control of the deep muscles and the delay in the APA response. However, demonstrating independent control of the APA and focal muscle control systems is difficult. A modified Go-Stop test protocol was used to determine if inhibitory control parameters differentially influenced the deep trunk vs. the focal muscle systems.
Methods: Surface EMG signals were collected (1000 Hz) bilaterally from the anterolateral abdominal (ALA) and AD muscles. Each subject (n=4) was required to rapidly raise her arm to trigger an optical switch. The arm movement was co-ordinated with a rapidly moving clock hand on a computer screen placed in the subject's view. The time difference between the switch and the clock hand reaching the 12 position was used as feedback about accuracy of performance. Two blocks of trials were conducted: first, for training, a set of trials with only GO trials to establish the baseline activation profiles second, a block of GO and STOP trials randomly assigned at a ratio of 5:1 were given. A total of 826 trials were examined with synchronised EMG data amplitude were assessed in an APA epoch -50 ms to +50 ms (0 ms = AD muscle onset); EMG amplitudes were assessed in 4 conditions: Failed stops, 1st and 2nd GO trial after a STOP (T1 & T2) and Partial STOPs.
Results: The Left ALA muscles were active in the APA window prior to AD while the R ALA were activated with AD. The amplitudes of the AD and R ALA muscles were unchanged for failed stop and Go (T1&T2). The RALA was unaffected when the AD was inhibited during partial stops. In contrast, the L ALA demonstrated a constant degree of inhibition for all test conditions (Go or Stop) and is affected by the global potential to STOP (i.e.2nd block).
Conclusions: The APA response of the ALA muscles show laterality differences with the contralateral ALA consistently activated prior to the ipsilateral ALA muscles. Further, the contralateral ALA muscles show an inhibition independent of the trial commands which suggests a central inhibitory effect independent of the trial condition (.ie. the possibility of a stop). The ipsilateral ALA demonstrated little changes under different trial conditions. The asymmetric activation of the ALA muscles has implications in understanding motor control deficits reported in LBP populations and the role these muscles have in APAs.

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Improvement in stability of the paretic arm in patients with hemiparesis using bimanual arm tasks

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Introduction: The paretic arm of individuals with hemiparesis has a diminished ability to resist sudden perturbations and to preserve stable movement patterns compared to healthy subjects. The goal of this study was to investigate how different types of participation of the contralateral arm may influence the stability of reaching movement of the paretic arm in individuals with post-stroke hemiparesis.
Methods: While sitting, non-disabled subjects and patients with hemiparesis on the dominant side performed a task in which they reached forward, grasped and removed a lid from a jar placed in the sagittal midline on a height-adjustable table. The task was performed in three conditions: bilaterally with both arms starting to move simultaneously; unilaterally while the contralateral arm held the jar; and unilaterally with the jar attached to the table. During some reaches, the arm removing the lid was suddenly and transiently stopped by an electromechanical device. Kinematic data from markers placed on the hands, arms and trunk were recorded. Among the kinematics analyzed was the deviation of the reaching trajectory of the perturbed arm in the frontal plane from the trajectory recorded during non-perturbed movement compared to that of the non-perturbed arm and the movement time. Temporal coupling (for bilateral movement only) was defined as a time difference in movement onset and offset between arms.
Results: Results showed that the movement of the paretic arm was more stable when the contralateral arm was involved in holding the jar, compared to the unilateral movement.
Conclusions: The results of this study may be used in the development of new rehabilitation approaches that include bimanual movements to improve functional recovery of the paretic arm in patients with hemiparesis due to stroke. Supported by NSERC.

WP-33

Obstacle avoidance during walking is speeded up with a startling auditory stimulus

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Introduction: Previous studies have reported that startling stimuli can speed up voluntary reactions. Reaction times are shortened by 60 to 120 ms (Carlsen et al., 2004; Valls-Solé et al., 2005) when an acoustic startle is presented simultaneously with the imperative signal to perform, for instance, arm movements to a target. It was suggested that this could be explained by the startle acting as an early trigger for subcortically stored prepared movements. This raises the question whether this phenomenon would also be present for leg movements and for other types of motor responses that are thought to rely on subcortical pathways. One example is the adjustment of stepping trajectories during obstacle avoidance (Weerdesteyn et al., 2004). These reactions are faster than voluntary reactions. Preliminary data indicate that these type of responses are possibly also speeded up by startle (Reynolds and Day, 2005). The aim of the present