Priming the brain: A single bout of aerobic exercise promotes motor cortical neuroplasticity.

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**Question:** Regular physical activity is associated with enhanced plasticity in the motor cortex, but does a single session of aerobic exercise promote neuroplasticity? **Design:** Randomised, within-participant experimental study. **Participants:** Twenty-five (16 F) healthy, moderately active adults. **Intervention:** Participants completed three experimental sessions during which they cycled on a stationary bike at a workload equivalent to 57% (low intensity, 30 mins), 77% age-predicted maximal heart rate (moderate intensity, 15 minutes), and a seated control condition. **Outcome measures:** Cortical excitability was examined each session using transcranial magnetic stimulation to elicit motor evoked potentials in the right first dorsal interosseus muscle. Levels of serum brain-derived neurotrophic factor and cortisol were assessed throughout the experiments. Neuroplasticity within the primary motor cortex was then examined using a continuous Theta Burst Stimulation paradigm. **Results:** Exercise did not alter cortical excitability. Following continuous Theta Burst Stimulation, there was a transient inhibition of motor evoked potentials during control and low intensity conditions but this was only significantly different following the low intensity state (p = 0.02). Moderate intensity exercise alone increased serum cortisol levels, but brain-derived neurotrophic factor levels did not increase across any condition. **Conclusion:** Low intensity lower limb cycling promoted the neuroplastic response to continuous Theta Burst Stimulation within the hand area of the motor cortex of healthy adults. These findings suggest that light exercise may be used to prime the brain, or promote widespread changes in the motor cortex and enhance the effectiveness of motor learning or recovery following brain damage.

Key Practice Points:

* A single session of lower limb cycling at low intensity promoted neuroplasticity within the motor cortex of healthy adults
* Increased neuroplasticity may facilitate motor learning and cortical reorganisation following brain injury
* Further research is underway to determine whether exercise to prime the brain can promote recovery following stroke