

EMG Muscle Activity During Imagined Movement Looks a lot like EMG During Movement

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Sports performance researchers from the Centre de Recherche et d'Innovation sur le Sport (C.R.I.S.), Université Claude Bernard in Lyon, France, sought evidence that mental imagery of motor function (MI) is accompanied by improvements in intramuscular conduction velocity (CV).

The investigators assessed surface electromyographic (EMG) activity of 3 muscles during elbow flexion and extension. Thirty right-handed participants were asked to either lift or to imagine lifting a weighted dumbbell under 3 types of muscular contractions: concentric, isometric and eccentric.

The study recorded and assessed EMG activity of the agonist muscles (long and short heads of biceps brachii) and the antagonist muscles (long portion of triceps brachii) muscles to determine the median frequency of the EMG power spectrum. The median frequency was significantly higher during the MI sessions than during the resting condition while the participants remained strictly motionless. Further, the muscle frequency during imagined concentric contraction was significantly higher than during the eccentric.

The researchers summarized that during mental imagery, the EMG patterns corresponding to each type of muscle contraction remained comparable to those observed during actual movement; and that the median frequency variation was correlated to the type of contraction the muscle produced. They conclude that motor programming is performed as a function of muscle contraction type during mental imagery.

Citation: Lebon F, Rouffet D, Collet C, Guillot A. Modulation of EMG power spectrum frequency during motor imagery. Neuroscience Letter. 2008 Apr 25; pages 435 (3): pp. 181-5. Epub 2008 Mar 10.