Internship (UZH internal):

Profiling the contributions of the reticulospinal system to various single-joint movements

We are looking for an enthusiastic student interested in neuroscience for a research internship.

Project description:

Movement control is mediated by different neural systems that allow the coordinated activation of different muscles. The corticospinal (CS) and the reticulospinal (RS) systems are the two main descending motor pathways that carry information from the brain to the spinal cord. The well-studied CS system is thought to play a key role in skilled motor actions such as dexterity and fine finger movements. The phylogenetically old RS system is mainly responsible for elementary movements such as posture and locomotion. However, the underlying neurophysiology of the RS system is not well understood. The RS system can be assessed by the StartReact paradigm which is characterized by a significant shortening of movement reaction time when movement initiation is paired with a loud acoustic stimulus.

This study aims at performing systematic profiling of StartReact effects during various single-joint movements of the upper and lower extremities. Surface electromyography (sEMG) will be used to assess muscle activity and motor reaction time. Additionally, a marker-based motion capture system will be used to get further information on kinematics. The outcomes will contribute to a better understanding of RS motor control in humans. This might translate into the development of new rehabilitative interventions for neurological patients such as acute spinal cord injury (SCI) patients.

This study will take place at the spinal cord injury center of the University Hospital Balgrist. This is a research hub on spinal cord physiology and pathophysiology.

Main tasks during the internship or master thesis:

- Getting familiar with EMG, motion capture, and the StartReact paradigm
- Data collection
- Raw data processing and extraction

Time frame: 4 to 12 weeks (upon agreement)

Start date: now (or later upon agreement)

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