Der Balgrist
Universitätsklinik Balgrist

ZENTRUM FÜR paraplegie balgrist

Master Thesis

Does Intra-Epidermal Electrical Stimulation Activate All Types of Nociceptors?

Supervisor: Sara Uldry Júlio
PD Dr. med. Martin Schubert

Duration: 6 months – 1 year

Description: The main tract for transmitting noxious stimuli is the spinothalamic tract, receiving its input from different types of small fibers in the skin i.e., mechanical or heat sensitive fibers. In spinal cord injury as in other pathologies involving neuropathic pain and sensation deficits it is crucial to assess spinothalamic tract integrity with objective methods. This depends on a well characterized stimulation modality, activating small fibers, and implies the recording of brain activity in response to this stimulation (electroencephalography; EEG). Intra-epidermal electrical stimulation (IES) using a concentric triple electrode is known for its clinical potential due to small fiber activation is a good candidate for the activation of the spinothalamic tract. However, it is still debated if IES activates all types of small fibers i.e., mechanical and heat sensitive small fibers, specific for nociception [1]. We address this question by comparing mechanical [2], heat [3], and electrical noxious stimulation in terms of evoked potentials, quality of sensation and habituation.

Training: The study involves the recruitment and measurement of young healthy control subjects. You will acquire knowledge about neurophysiological techniques such as evoked potentials (EP) and electroencephalography (EEG). You will take part in data acquisition, analysis, and discussion of the findings. In addition, you will get the chance to help in building up a follow-up experiment.

Start: Immediately

Contact: sara.uldryjulio@balgrist.ch

Reference:

1. Mouraux, A., G.D. Iannetti, and L. Plaghki, *Low intensity intra-epidermal electrical stimulation can activate Adelta-nociceptors selectively.* Pain, 2010. **150**(1): p. 199-207.
2. Scheuren, P.S., et al., *Pain-autonomic interaction: A surrogate marker of central sensitization.* Eur J Pain, 2020. **24**(10): p. 2015-2026.
3. De Schoenmacker, I., et al., *An intensity matched comparison of laser- and contact heat evoked potentials.* Sci Rep, 2021. **11**(1): p. 6861.