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Transligual neurostimulation (TLNS): the toolbox for neurorehabilitation

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Abstract

Translingual neurostimulation (TLNS) and new neurorehabilitation technology represents a synthesis of a non-invasive brain stimulation technique with multiple applications in physical medicine, neurorehabilitation, cognitive, and affective neuroscience. New stimulation method appears promising for the treatment of balance, posture, movement disorders, and also for both cognitive dysfunction associated with severe neurological disorders: traumatic brain injury, stroke, multiple sclerosis, Parkinson's disease, cerebral palsy. The TLNS integrated with physical therapy aims to restore function beyond traditionally expected limits by employing both newly developed therapeutic mechanisms for progressive physical and cognitive training - while simultaneously applying brain stimulation through the dorsal surface of the tongue by portable neurostimulation (PoNS) device. TLNS uses sequenced patterns of electrical stimulation on the anterior dorsal surface of the tongue to stimulate lower branches of the trigeminal and facial nerves. The trains of neural impulses eventually produce changes of neural activity in corresponding nuclei of the brainstem – in the sensory and spinal nuclei of trigeminal nuclei complex, the caudal part of the nucleus tractus solitarius, cochlear, cuneate and hypoglossal nuclei and the spine (C1- C3).

Biography:

Yuri Danilov, PhD, currently is the Science Director of "Rehaline" rehabilitation center, Moscow, Russia. He is former Senior Scientist and Neuroscience Director in Tactile Communication and Neuromodulation Laboratory (TCNL), Biomedical Engineering Department, UW-Madison, USA. Dr. Danilov received the M.S. degree in biophysics, in 1978, from St. Petersburg University in Russia and the Ph.D. degree in neuroscience, in 1984, from the Pavlov Institute of Physiology. He is a system neuroscientist with experience in research on the special senses, including vision, taste, hearing and balance. Dr. Danilov is the lead discoverer and developer of the Transligual Neurostimulation technology

Speaker Publications:

1. Portable neuromodulation induces neuroplasticity to re-activate motor function recovery from brain injury: A high-density MEG case study
2. Brain vital signs detect information processing differences when neuromodulation is used during cognitive skills training
3. Brain vital signs detect cognitive improvements during combined physical therapy and neuromodulation in rehabilitation from severe traumatic brain injury: Case report
4. Translingual neurostimulation for the treatment of chronic symptoms due to mild-to-moderate traumatic brain injury
5. Human translingual neurostimulation alters resting brain activity in high-density EEG

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