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System Neuroscience in Dentistry

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Abstract

In the field of dentistry, system neuroscience is a very important concept for treating patients with diseases related to central nervous system in the oromandibular and maxillofacial regions, such as oral cognitive deficits in psychiatric patients, oromandibular movement disorder, and cognitive impairment that maybe related to masticatory deficits. Comprehensive and multidisciplinary understanding from the peripheral neuromuscular to the central nervous systems can lead to appropriate therapy for these patients. In the present study, we examined oral dysesthesia complaining medically unexplained symptoms, movement disorders such as dystonia/dyskinesia in the oromandibular and maxillofacial regions, and partially edentulous patients. In order to evaluate the interrelationships among sensory, motor, and cognitive functions in dysesthesia, dystonia/dyskinesia, and denture wearing subjects, jaw motion and jaw EMG activities, as well as cortical activities were determined using a jaw motion tacking device, EMG amplifier, and functional near-infrared spectroscopy (fNIRS) system, respectively. Our results were as follows.1)Patients suffering from oral dysesthesia and unexplained occlusal discomfort showed prefrontal deactivation, which was significantly related to an increase in somatization score in the SCL-90R. 2)Oromandibular dystonia was associated with involuntary muscle contractions and cortical activities in the pericentral cortical area. Following botox injection into involuntary contracted jaw muscles, muscles activities and involuntary movements were decreased, and cortical activities in the pericentral cortex area became to be normalized. 3) Denture wearing caused prefrontal cortex activation that was statistically related to masticatory behavior and awareness of chewing ability. Based on our findings, we consider that comprehensive and multidisciplinary understanding system neuroscience in relation to sensorimotor and cognitive functions in the oromandibular and maxillofacial regions should be promoted in the dentistry field.

Biography

I completed my PhD at Tokyo Medical and Dental University in 1987.From 1993 to 1995, I went to University of Toronto in order to obtain postdoctoral training regarding Neurophysiology from Dr. Barry J Sessle. Recently, I newly created the Neurological Dentistry for Movement Disorders Department in the Hospital of Nihon University School of Dentistry at Matsudo in 2011. I recently published a paper in *NEUROSCIENCE* titled 'Systemic pregabalin attenuates sensorimotor responses and medullary glutamate release in inflammatory tooth pain model.'