Vestibular influences on respiratory endurance.

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Accepted September 29, 2017

Editorial

The vestibular system, which is comprised of tiny receptors in the inner ear plays a major role in maintenance of posture and equilibrium. Apart from its regular function, vestibular system influences all the body systems and contributes to homeostasis. Hence stimulation of vestibular system, which begins in the intrauterine life, must be continued throughout the life. Vestibular regulation of respiratory functions is mediated by the reflexes that from medial and inferior vestibular nucleus. Vestibular projections are identified throughout the brain and in fact certain brain structures like hippocampus undergoes atrophy followed by vestibular lesions. Postural changes activate of pulmonary receptors and stretch receptors in the respiratory muscles which will affect the respiratory muscle [1,2]. Numerous studies have shown that vestibular nerve stimulation produces a reflex response in phrenic nerve, intercostal nerve and abdominal muscle nervre [3-5]. Vestibular system maintaining posture through its action on limb muscle and these influences also extend to the respiratory postural muscles [6]. The stable venous return to the heart during movements and changes in the posture may provide by the vestibulo-respiratory reflexes in concert with vestibulo-sympathetic reflexes. The augmented contraction of the diaphragm increases negative intrathoracic pressure this would result in more blood being pulled in the heart. The blood from abdomen into the thorax is forced by the increased activities of the abdominal muscles which also enhances venous return [7,8].

The regions of the vestibular nuclei which participates in vestibulo-sympathetic reflexes and the same is the mediator for vestibular influences on respiration. the brainstem neurons have the responsibility for central respiratory drive. the vestibulo-respiratory reflexes have considered the same role of brainstem neurons here. The dorsal respiratory and the ventral root ganglion are the two groups of respiratory neurons in the medulla. The dorsal group ganglion is located in the ventrolateral portion of the nucleus of the solitary tract. It contains predominately inspiratory neurons, including bulbo-spinal neurons that convey descending respiratory drive to motor neurons supplying the diaphragm and inspiratory intercostal muscles. The ventral respiratory group (VRG) is located in the ventrolateral medulla and extends from the nucleus retro-ambigualis at the border with the first cervical spinal segment (caudal end) to the nucleus ambiguus and retro-facial nucleus (rostral end). The VRG contains heterogeneous cell types, including bulbo-spinal inspiratory and expiratory neurons. Medullary interneurons, and laryngeal and pharyngeal motor neurons. A third group of respiratory neurons is located in the parabrachial region of the pons. Shaping the property of respiratory activity might also the responsibilities of other vestibular connection. Recent neuroanatomical studies have demonstrated a projection from the supe rior vestibular nucleus to the vicinity of the pontine respiratory group [9]; however, vestibular inputs to pontine respiratory neurons are yet to be evidenced neuro-physiologically. Neurons in the raphe nuclei also receive vestibular inputs [9]. Role of vestibular stimulation has been extensively studied in recent years which is evident by published articles on vestibular stimulation and registered clinical trials. This is the need of time to understand the essentiality of stimulation of the vestibular system in our everyday life style to improve the quality of life.

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