**Human Adaptations for Electrical-Neuromodulation induce-Locomotion in complete spinal cord injury individuals**

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Recent research advances in the field of spinal cord neuromodulation have proof that spinal electrical stimulation can activate latent neural networks in the lumbosacral spinal cord without any input from the brain. This results has compel some spinal cord injury (SCI) researchers to question the validity of the residual substrate under which this and other neural or neuromuscular interfacing technologies may work. In an attempt to restore function and regain motor control our initial work embark in applying direct currents to stimulate nerve and muscles in animals and humans. Motor unit recruitment (mur) through neural interface devices (NID) follow the same principles of rate coding which is equivalent to  **mur + >** ƒ in relation to ***Ŧ*** . We didn't found differences in animals between direct cord, peripheral nerve and neuromuscular stimulation in the motor unit recruitment of paralysed muscles. Direct neuromuscular interface current stimulation, according to the task specificity,  predispose all motor units to recruit and easily fatigue if the task was related to > 65% of muscle tension. We have proof that it was possible to augment muscle force and  trophism in the paralysed limbs of upper motor neuron SCI, but results weren't similar for every SCI subject. Muscle ultrastructure electron-microscopy analysis reported lack of EC coupling mechanisms in degenerated muscle fibers and seems time-dependent. Some other clinical-laboratory results proof that SCI walking following a task-specificity training by means of a neuromuscular interfacing device was possible in SCI subjects but was time-limited. Understanding some of the walking limitations in SCI individuals our laboratory latest clinical results show that blood return, cardiocirculation as well as ventilatory responses lack direct neural afferent feedback mechanisms from the moving muscularskeleton systems below the level of injury. Feedback seems possible through metabolic pathways that seems time and blood return related. Blood return, cardiovascular and pulmonary responses seems to play an important work in facilitating body adaptation to the effort. This result pinpoint the importance that physiological and metabolic responses need to be considered when permitting paralysed limbs to move either by new acquire latent neural networking or by direct neural or neuromuscular interface devices. Current studies are undergoing to understand if neuromuscular interfacing devices can facilitate latent networking activity.