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Clinical improvements for spinal cord injured subjects going through innovative rehabilitation techniques and paralympic sports

Alberto Cliquet Junior^{1,2}

¹Universidade de Campinas, Brazil

²Universidade de São Paulo, Brazil

The work presented here displays comprehensive neurologic and orthopedic rehabilitation strategies based upon neuromuscular stimulation, including basic concepts and clinical implications, being twofold: (1) Medical sciences towards functional diagnoses, therapy, cardiovascular health and paralympic sports performance; (2) engineering sciences on innovative technology for rehabilitation of Spinal Cord Injured (SCI) subjects. Artificial and voluntary gait recovery are shown to be feasible, being assessed through motion analysis, electromyography, evoked potential, magnetic resonance imaging, radiography, oxygen consumption, bone densitometry, etc. Comorbidities such as post-traumatic syringomyelia (due to upper limb effort), disuse osteoporosis, cardiovascular disease and autonomic dysreflexia (yielded by pain stimuli and lack of sympathetic nervous system) are addressed. Loss of bone mass is known to be higher in tetraplegia than paraplegia and the same applies to carotid intima-media thickness of SCI subjects which is larger in tetraplegics. SCI physiotherapy focuses mostly on cardiovascular exercises, not on the mechanical loads applied to the lower limbs which are required to preserve bone quality. Shoulder, hip and knee joints are also looked at, in particular for the athletes. Technology innovation is presented for spasticity evaluation, upper limb movement as well as thermal stimulation towards the lesion completeness diagnoses. Rehabilitation techniques, technology and sports can yield a longer life to such patients and minimize their clinical complications.

Biography

Alberto Cliquet Junior has graduated from Universidade de São Paulo (USP) and PhD (1988) from the University of Strathclyde. He is a full Professor at the Department of Orthopedics, Universidade de Campinas-UNICAMP (from 2003) and full Professor at USP (since 1998). Currently he is the Deputy Coordinator of the Surgery Postgraduate course and the Coordinator for the Orthopedics undergraduate course.

cliquet@fcm.unicamp.br

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