
Effects of functional electrical stimulation used for strengthening and rowing in people with spinal cord injury.

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Résumé

For years, functional electrical stimulation (FES) has often been used to facilitate exercise in individuals with spinal cord injury (SCI). It can produce functionally useful leg movements such as leg flexion/extension, standing, walking, cycling, and even rowing [1-4]. More specifically, FES-rowing, involving both innervated upper body and electrically stimulated lower body muscles, has been proposed to help SCI people to produce greater aerobic power and oxygen consumption than either upper body or lower-body FES exercise alone [3].

However, although the aim of FES is mainly to generate muscular contractions and produce a functionally useful movement, strengthening exercises such as static or dynamic FES-induced leg flexion/extension, have been demonstrated to be important before the entrance in a FES-rowing/cycling protocol in order to be able to perform the movement. Indeed, as reported by Wheeler et al. [4], during FES rowing, lower-extremity strength, endurance and fatigue determine the degree to which the full rowing stroke can continue.

To date, several studies reported decreases in muscle atrophy, improvements in bone mineral density and increases of aerobic capacity using FES training during several weeks [5,6]. However, little data exist on the effects of a long-term FES-rowing training program and on the effects of the association of FES-strengthening and FES-rowing. In addition, most studies investigating the effects of FES training (and more particularly FES-rowing) involved SCI people who were mostly sedentary and data on SCI athletes are scarce.

The present communication will therefore try to answer some of these questions with data regarding the effects of FES-strengthening followed by FES-rowing on skeletal muscle strength and thickness, bone mineral density (BMD) and cardiorespiratory function in people with SCI who were either physically inactive or athletes.

References :

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