The reorganisation of the neuromuscular system during ageing: influence of regular physical activity

Professor Jacques Duchateau

Professor at the Université libre de Bruxelles, and Director of the Laboratory of Applied Biology Research Unit in Applied Neurophysiology, Faculty for Motor Sciences

Abstract

Ageing is accompanied by changes of the neuromuscular system that contribute to the decline in functional performances observed in elderly individuals. The most visible alteration is a decrease in muscle mass (i.e. sarcopenia) due to the atrophy of muscles fibres and the reduction of their number. Senescence is also associated with a loss of motor neurones and reinnervation of some of the denervated muscle fibres by the surviving motor units leading to the development of "giant" motor units. This profound age-related motor unit remodelling has functional implications on the neural control of muscle contraction and in particular on fine motor tasks. In addition to this reorganization, part of the decrease in maximal force and rate of force development may be due to incomplete activation of the agonist muscles by the central nervous system and to intensified current antagonist muscle activation (coactivation). The control of movement and balance during upright standing is further accompanied by a greater involvement of the supraspinal structures in elderly compared with young adults. Interestingly, experiments performed in the last 2-3 decades have shown that regular physical activity may, in part, counteract or reverse the age-related alterations encountered by the neuromuscular system. It has been even suggested recently that long-term aerobictraining might have a neuroprotective effect on the loss of motor neurones.

Professor Jacques Duchateau's bio

Jacques Duchateau is currently professor at the Faculty for Motor Sciences of the Free University of Brussels, Belgium. He is also director of the Laboratory of Applied Biology and Research Unit in Neurophysiology. His research interests are related to the understanding of the neuromuscular mechanisms that mediate acute

adjustments during exercise and chronic adaptations to strength and power training. As former athlete and national coach in athletics, he is also involved in field researches and responsible for the testing of strength and power of the top athletes from the French Community of Belgium. He published more than 250 articles in international scientific journals, books and sport-related journals.

More information here: http://homepages.vub.ac.be/~jduchat/JD-resume.html