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Modulations of the Human Trapezius Muscle H-Reflex Following Eccentric Exercise

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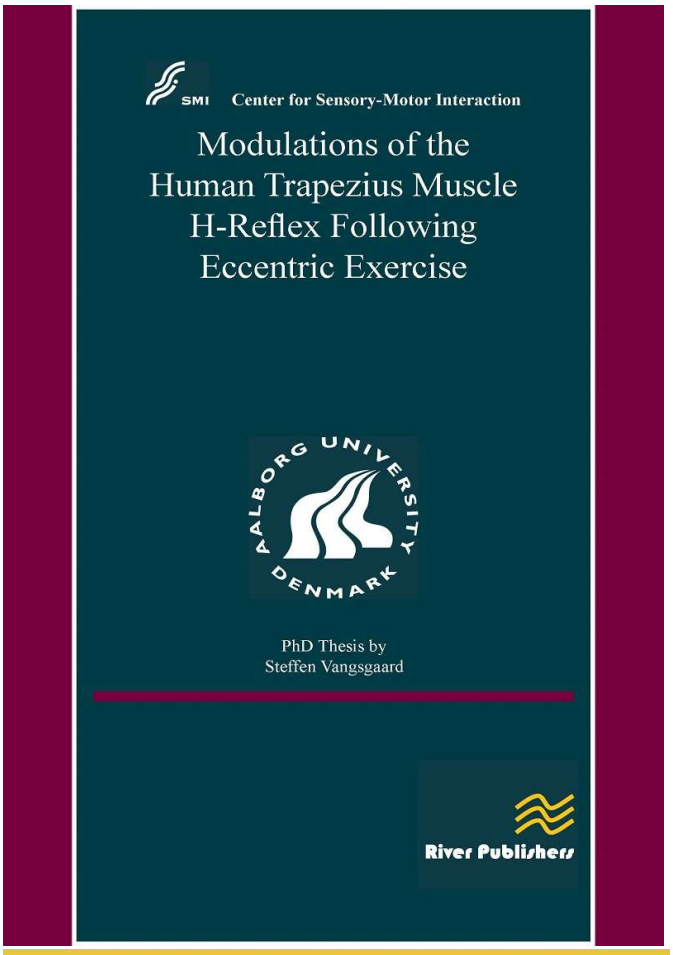
The trapezius muscles form very important parts of the neck-shoulder region and are commonly involved in musculoskeletal disorders. Interestingly, the motor and sensory innervation to trapezius is divided into the accessory nerve and the C3/4 cervical nerve, respectively. It is thereby possible to evoke H-reflexes in the trapezius muscle with minimal influence of M-waves which may allow special insight into the spinal mechanisms of this muscle. However, only a few studies exist on these responses and none have investigated the effects from muscle soreness or strength training.

When performed at a high intensity, eccentric contractions can lead to delayed onset muscle soreness. However, when the intensity is progressively increased, eccentric training has shown promising results with regards to strength training and rehabilitation. Still, knowledge on neural adaptations at the spinal level following eccentric exercise is lacking. The overall aim of this thesis was therefore to provide new insights into the spinal mechanisms of the human trapezius muscles and its response to eccentric exercises. For this purpose, four studies, all involving percutaneous electrical stimulation to elicit trapezius muscle H-reflexes and M-waves, were performed.

In Study I, outcome measures of the trapezius muscle H-reflex were reported. In Study II, the absolute and relative reliability of these measures were investigated and found to be good enabling the assessments of physical interventions. In Study III, a single session of high-intensity eccentric exercises resulted in a decrease in the H-reflex most likely reflecting presynaptic inhibition of the ?-motoneurons. On the contrary, five weeks of eccentric strength training resulted in an increase of the maximal amplitude of the trapezius muscle H-reflex, reflecting an increase in the net excitability of the ?-motoneurons (Study IV).

The present findings confirmed the separated sensory and motor innervation of the trapezius muscle. Moreover, this series of studies investigated and documented for the first time changes



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