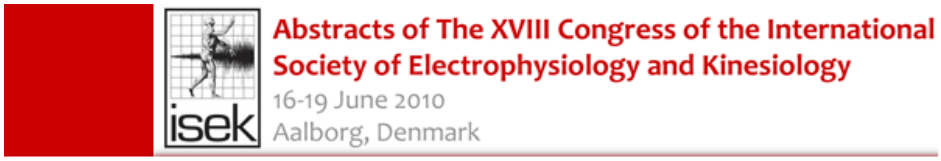

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The Organizing Committee ISEK 2010
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EFFECTS OF ECCENTRIC EXERCISE ON FORCE STEADINESS AND VOLUNTARY ACTIVATION OF THE KNEE EXTENSORS

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AIM: The purpose of this study was to investigate the effects of eccentric exercise of the knee extensors on force steadiness and neural drive to the vasti muscles during submaximal isometric contractions.
METHODS: Ten healthy subjects (age, mean ± SD, 24.9 ± 3.2 yrs) participated in the study. The subjects performed maximum voluntary contractions (MVC) of the knee extensors followed by isometric contractions at 2.5, 5, 10, 15, 20 and 30% MVC at baseline, immediately after and 24h after eccentric exercise of the quadriceps. During each contraction, force and surface EMG of the vastus medialis (VM), vastus lateralis (VL), biceps femoris (BF), and semitendinous (ST) muscles were recorded concurrently. Force steadiness was characterized by the coefficient of variation (CoV; SD divided by mean, %) of the force signal.
RESULTS: The MVC force decreased from baseline (665.5 ± 256.9 N) to 24 h post exercise (596.2 ± 123.2 N, $P<0.001$) and from immediately post exercise (636.5 ± 131.8 N) to 24h post exercise ($P<0.05$). The CoV during the submaximal isometric contractions was greater immediately after eccentric exercise (up to 66% higher than baseline values, $P<0.001$; Fig 1A) and remained higher 24h post exercise (up to 50% higher than baseline values, $P<0.01$). Reduced force steadiness was accompanied by increased EMG amplitude of the vasti muscles ($P<0.01$) (Fig 1B) whereas the EMG amplitude of the BF and ST did not change across conditions ($P>0.05$).
CONCLUSION: Eccentric exercise of the quadriceps impairs knee extension force steadiness and is associated with reduced activation of the vasti muscles both immediately after and 24h after exercise. This reduction in force steadiness is not due to increased antagonist activity.
ACKNOWLEDGEMENT: Grant SFRH/BD/31796/2006 from Fundação para a Ciência e a Tecnologia (FCT) of Portugal.

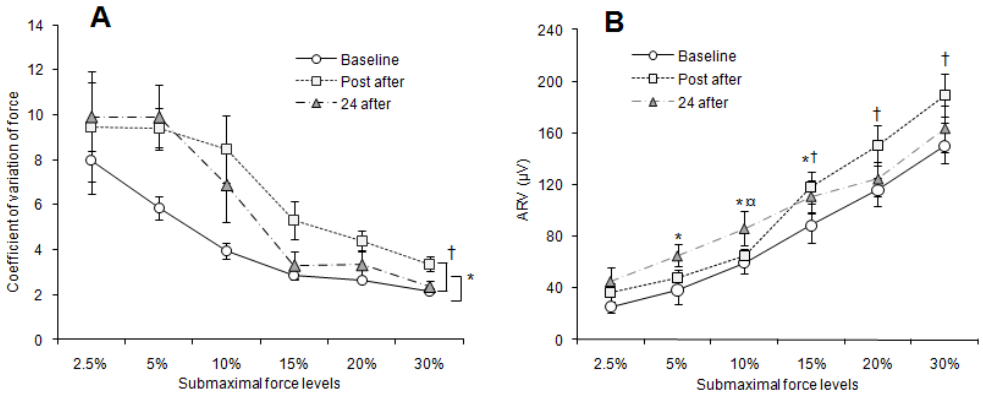

Figure 1: Coefficient of variation of force (A) and EMG amplitude of the vasti muscles (B) during isometric contractions at 2.5, 5, 10, 15, 20 and 30% MVC, before, immediately post and 24h after eccentric exercise of the quadriceps. †: $P<0.05$ from baseline to immediately

post exercise; *: P<0.05 from baseline to 24h post exercise; ¤: P<0.05 from immediately post to 24h post exercise.