higher discharge rates of the recruited motor units. Further analysis should investigate if the higher activation of VM relative to the VL in CKC versus OKC is related to differences in motor unit behavior.

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3 NMF/MC
Stretching-induced crossover effect: partitioning the mechanisms by an EMG, MMG and force combined approach

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Aim: After an acute bout of passive stretching (PS), the performance of the stretched muscle (SM) is depressed [1]. Often this occurs also in the contralateral muscle (CM), which is not involved in the PS manoeuvre [2]. This phenomenon is called crossover effect. Mechanisms underpinning PS-induced crossover effect are still unclear. The use of an electromyographic (EMG), mechanomyographic (MMG), and force (F) combined approach may help to shed more light on this phenomenon [3].

Methods: Twenty-one participants (age: 22 ± 3 years; stature: 1.75 ± 0.08 m; body mass: 73 ± 9 kg, mean ± SD) underwent a single-leg PS-bout (5 elogantions of 45 s) of the knee extensor muscles (KE). Before and after, the maximum voluntary contraction (MVC), the percentage of muscle activation, detected by the interpolated twitch technique (VA $_{\%}$), and the range of motion (ROM) of the KE of both legs were measured. During contraction, EMG, MMG and F were recorded from the vastus lateralis, medialis and rectus femoris muscle of SM and CM. The total electromechanical delay ($Delay_{TOT}$) and its components (Δt EMG-MMG, electrochemical component; Δt MMG-F, mechanical component) were calculated off-line for each muscle.

Results: After PS, MVC and VA % decreased in both legs (−15 and −10% SM, −8 and −7% CM; P from 0.01 to <0.001). The ROM increased (+14% SM, +6% CM; $P = 0.02$ and 0.04). Independently from the muscle, $Delay_{TOT}$ (+20% SM, +12% CM; $P = 0.007$ and 0.01) and Δt EMG-MMG lengthened in both legs (+24% SM, +12% CM; $P = 0.002$ and 0.009), whereas Δt MMG-F lengthened only in SM (+28%, $P < 0.001$).

Conclusions: The present findings suggest that PS-induced crossover effect seems to be due to alterations in the chain of electrochemical events linked to the excitation–contraction coupling (longer Δt EMG-MMG) likely provoked by a decrease in the central motor command (reduced MVC and $VA_{\%}$).

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4 NMF/MC
Effects of marathon fatigue on the discharge rates of individual motor units in older adults

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Aim: Age-related changes in motor unit properties are essential to understand muscle behavior after exercise in older adults. In this study, we compared the changes in motor unit discharge rates during steady isometric contractions before and after a half-marathon in elderly individuals.

Methods: During the event Run4Science, we recorded high-density surface electromyography (HD-sEMG, 128 channels) on the tibialis anterior muscle (TA) in eight old subjects. Subjects executed a 40 s static dorsiflexion at 25% MVC. The test was performed in two consecutive days, the first under non-fatigue conditions before half-marathon (BM) and the second immediately after half-marathon (AM). Using a novel decomposition technique for HD-sEMG recordings (Negro et al. 2016), we compared the changes in the discharge properties of the TA motor units before and after the half marathon. We calculated the global average discharge rate value (GADR) of all MUs in the two conditions. Only MU pulse trains with a silhouette measure > 0.9 were used in the study.

Results: We extracted the individual contribution of 486 unmatched MUs (∼ 30 per contraction). The GADR were 13.43 ± 1.46 (pps) and 14.89 ± 1.67(pps) for the BM and AM conditions respectively. Paired T-test analysis showed a significant difference between conditions ($P < 0.05$).

Conclusion: The results showed that the discharge rates of the identified MUs increase after the half-marathon. Future work will focus on the tracking of the same MU in the two conditions (Martinez-Valdes 2017) in order to increase the sensitivity of the estimation.

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5 NMF/MC
Motor output relative error during static linear maximal torque ramp: influence of the age

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Aim: To evaluate if the torque output relative error during linearly varying static contractions can be influenced by possible changes in