Image Article

Post-exercise T2 prolongation and recovery kinetics of upper arm muscles in non-athletes and athletes

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Post-exercise T_2 prolongation and recovery kinetics of upper arm muscles in non-athletes and athletes

Figure 1 is showing relaxometric maps of the right upper arm of non-athlete and athlete, depicting the time course of exercise induced changes (concentric elbow flexion exercise to failure - weight lifting with 75% of 1RM). T_2 maps acquired before exercise, immediately after exercise and 30min and 60min later during recovery are shown.

Protocol: prone position, transverse mid-humerus upper arm images (slice thickness 10mm, FoV 256x512, matrix size 256x128) were obtained by using a multiple spin-echo sequence with TR-2520ms, TE-10, 20, 30, 40,50,60,70, 80,90, 100, 110, 120, 130, 140, 150,160ms on the Magnetom Aera TIM Siemens (Siemens, Erlangen, Germany). T2 time values before, immediately after exercise, as well as after 30min and 60min of recovery were calculated from automatically generated T2 maps in the whole muscle area on the scanner.
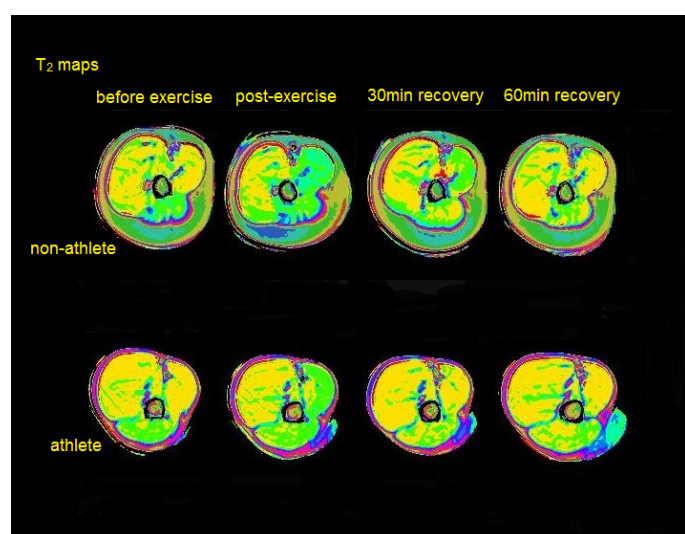
Post-processing was obtained by using MIPAV software [1]. Color change in active regions of m.biceps brachii immediately after exercise, as well as 30min and 60min after exercise corresponds to T_2 time prolongation and recovery. In non-athlete, T_2 recovery with returning to baseline values in m.biceps area was noticed after 60min recovery. In athlete, post-exercise T_2 prolongation value in m.biceps area was twice lower than in non-athlete with same relative exercise intensity, and it reestablished baseline values faster, after only 30min of recovery.

Comparing T_2 prolongation and recovery kinetics in athletes and non-athletes could provide additional information on metabolic changes in exercising muscle as well as muscle activation patterns in the light of previous exercise history, which could improve treatment strategies for training and rehabilitation exercise protocols [2-4].

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Figure 1. Relaxometric maps of the right upper arm of non-athlete and athlete, depicting the time course of exercise induced changes (concentric elbow flexion exercise to failure - weight lifting with 75% of 1RM). T_2 maps acquired before exercise, immediately after exercise and 30min and 60min later during recovery are shown.

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