Effect of high-intensity sprint training
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The protocol of sprint training is dependent on multiple factors, including exercise duration, intensity, number of sets, and rest period between the sets. In addition, distribution of exercise and rest within a day or a week has been suggested to affect adaptations in response to sprint training. The results from the experiment indicated that sprint training twice every second day caused further improvements of anaerobic power output and lactate metabolism compared with the same training once daily. 12 consecutive days of sprint training followed by 6 days of detraining period increased markedly intramuscular phosphocreatine (PCr) concentrations as well as peak power output during 30s maximal pedaling. Furthermore, we also determined influences of hypoxia on repeated sprint ability in ball game players. Consequently, the repeated sprint training in moderate hypoxia caused significantly greater increase in power output during the repeated sprint test compared with the same training in normoxia. These findings will be available for designing training program in order to improve anaerobic exercise capacity in athletes.

Key words: sprint training, recovery, anaerobic capacity, athletes

Functional roles and plasticity of the human tendon structures in vivo
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In the last decade, several studies have used ultrasonography to investigate the functional roles and plasticity of human tendon structures in vivo. Among them, we demonstrated a greater increase in stiffness of tendon structure following isometric training using longer duration contractions compared to shorter contractions (Kubo et al. 2001 J Physiol). Furthermore, maximal elongation of the tendons at 1 month of detraining was greater than that post-training, and the tendon stiffness had already returned to the pre-training level at 1 month of detraining (Kubo et al. 2010 J Strength Cond). However, the mechanism resulting in the differences in training effects are unknown. To date, the oxidative metabolic rate of tendons has been considered to be relatively low. Recently, we developed a method for measuring the blood volume and oxygen saturation of human tendons using three red laser lights (Kubo et al. 2008 Acta Physiol Scand). Using this technique, we showed that the blood volume of tendon increased after 12-weeks of dynamic training (tendon stiffness did not change), and that did not change after isometric training (tendon stiffness increased considerably) (Kubo et al. 2009 J Appl Physiol). These results indicated that training-induced changes in the human tendon properties differ among the exercise protocol used. Furthermore, these differences would be related to changes in blood circulation within the tendons.

Key words: stiffness, blood circulation, training