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Regular training of competitive cycling induces muscle-specific adaptation of synergistic muscles

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This study examined the influence of regular training of competitive cycling on the quantitative profiles of the quadriceps femoris and psoas major cross-sectionally and longitudinally. In the first experiment, T1-weighted magnetic resonance (MR) images of the trunk and thigh were obtained from 8 experienced (experience: > 4 years) varsity male cyclists and 8 untrained male students. In the second experiment, MR images of the trunk and thigh were obtained from 7 varsity male cyclists (experience: 0.5-13 years) twice (6 months in-between; cycling training: 16 hours per week on average). From the MR images, the volumes of each muscle of the quadriceps femoris and psoas major were determined. The muscle volumes of the vasti (vastus lateralis, vastus medialis, vastus intermedius) and psoas major were significantly greater in the experienced cyclists than in the untrained students, whereas that of the rectus femoris was comparable for the two groups. In the second experiment, significant increases in the volumes of the vasti and psoas major were observed after 6 months training, although the rectus femoris volume did not change. Relative increases in the muscle volume of the vastus lateralis, vastus medialis, and psoas major were significantly greater than that of the rectus femoris. The current findings indicate that regular training of competitive cycling induces muscle-specific adaptation of the knee extensor and hip flexor muscles, leading to inferior muscularity of the rectus femoris compared to the vasti and psoas major in the experienced cyclists.