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» Journal Abstract

Hip and knee flexors and extensors balance in dependence on the velocity of movements

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Balance of the muscles in the joint is determined as the ratio of torques between the agonists and antagonists. Deficiency in one muscle group may lead to an imbalanced action in that joint and cause musculoskeletal injuries. The aim of the investigation was to determine the ratio of torque values between hip and knee joints flexors and extensors in the different positions of the range of movements at medium and high velocity of movement. The hip joint flexors and extensors, and knee flexors and extensors were tested by the dynamometer system "REV-9000" Technogym in the isokinetic movements with the medium angular velocity 100°/s and high velocity 200°/s. The 11 male students of Latvian Academy of Sports Education with the average age 24.3±4.5 years participated in the investigation. The flexors/extensors torque ratios for the hip and knee joints were calculated in different positions of the joints range of movements with the step 10° and it was found that this ratio changes in dependence on the joint angle. Our results show that the risk of the hamstring injury doubles at high velocity of movements in comparison with the medium velocity because the hip flexors/extensors torques ratio in the flexed positions of the hip (50° and 60°) at the fast velocity becomes twice higher due to growth of the hip flexors produced torques (hip flexors/ extensors toques ratio is 83-93 % at the velocity 200°/s and 47-48% at 100°/s). In the knee extreme extension the hamstrings/ quadriceps torque ratio at the fast velocity of movements is slightly higher due to higher value of the hamstrings produced torques with the aim to decelerate the knee extension to prevent the knee injury.

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