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PERFORMANCE OF RAT PLANTAR FLEXOR MUSCLES BY ACTIVE STRETCHING DURING ANKLE ROTATIONS AND ISOMETRIC CONTRACTIONS

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The performance of rat plantar flexor muscles by repeated stretches (30) using velocity-controlled ankle rotations from 1.57 to 0.70 rad (0.87 rad s^{-1}: slow stretch, 10.47 rad s^{-1}: fast stretch) and repeated isometric contractions (30) at 1.13 rad was examined. Performance was assessed by the isometric force at ankle positions of 1.57 and 0.70 rad and the time to produce 50% of the maximal force at 1.57 rad. Stretches were superimposed on maximally active muscles. Rest periods (3 min) between contractions (1900 ms) eliminated effects of fatigue. Isometric contractions resulted in a linear reduction in force at 1.57 rad (total deficit 13.8%). For slow and fast stretches, half of the total deficit at 1.57 rad (about 30%) was completed after six stretches. From stretch number 18 to number 30, slow stretches tend to produce greater force deficits, although this was not significant (two way ANOVA, P=0.09). Half contraction times increased linearly for stretches but were larger than for isometric contractions. Reductions in isometric force were greater at an ankle position of 1.57 rad than at 0.70 rad. One hour of rest following the stretches and isometric contractions did not restore muscle performance. It is concluded that isometric contractions of skeletal muscle can create a force deficit which is much less than that following stretches. The velocity of ankle rotations producing stretches of rat plantar flexor muscles working in situ is not a factor in reducing muscle performance. Supported by NIOSH R01-OHAR-02918

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