Effects of Movement Velocity and Contraction Pattern of Resistance Training on Muscle Damage

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Purpose: This study investigated the effects of movement velocity and contraction pattern on muscle damage during a single bout of resistance training.

Methods: Forty healthy young men were randomly assigned to four groups: the Normal Slow group (NS; 5 seconds for concentric and eccentric phases), Concentric Slow group (CS; 7 seconds for concentric phase, 3 seconds for eccentric phase), Eccentric Slow group (ES; 3 seconds for concentric phase, 7 seconds for eccentric phase), and Normal Speed group (N; 1 second for concentric and eccentric phases). The total resistance training time for elbow flexor muscles was standardized to 300 seconds. Maximal isometric strength (MS), muscle thickness (MT), muscle echo-intensity (EI), and muscle hardness (MH) were measured before, immediately after, 1 day after, and 2 days after training.

Results: There were no differences in the muscle activity during resistance training between the groups. All groups showed significant decreases in MS and increases in MT and EI immediately after training. There were no significant differences in the rate of change of these muscle properties between groups.

Conclusion: These results suggest that there is less influence of movement velocity and contraction pattern during a single bout of resistance training standardized total training time or muscle activity on damage of skeletal muscle.