**Exercise Induced Muscle Damage**

Although muscle tissue is extremely elastic, microdamage may occur in response to unusual exercise demands, especially when exercise includes eccentric contraction. Such muscle damage, in turn, negatively affects selected muscle damage parameters including performance output, range of motion, swelling, development of delayed onset of muscle soreness, and elevation of intracellular enzymes, such as creatine kinase and lactate. It is known that both intensity and duration of eccentric exercise can affect aspects of muscle damage and muscle performance. These indices of muscle damage are substantially reduced when the same muscle-damaging exercise is performed several weeks later, indicating a rapid adaptation of skeletal muscle to lengthening contractions. We proposed that this phenomenon has been attributed to neural, connective tissue or cellular adaptations, while other possible mechanisms such as alterations in excitation-contraction coupling or levels of inflammatory response may be involved. Nevertheless, eccentric exercise has been used as means to develop strength and muscle size. Based on the recent evidence derived from our lab, only 30 min of eccentric exercise per week for eight weeks markedly increased muscle strength and performance, REE, and lipid oxidation, as well as decreased insulin resistance and blood lipid profile. We also reported sufficient improvement of human performance and health, rendering eccentric exercise a promising novel type of physical activity. We have too conducted numerous research projects examining the effects of muscle damage on walking and running which are the most popular human activities. An exciting new aspect of this ongoing work is that eccentric exercise appears to confer health-related benefits, even when administered in a once-per-week fashion.

**Funding Sources**

Our work has been partly funded via university of Thessaly bursaries, by the Research Promotion Foundation of Cyprus, the Greek Ministry of Development, and Intramural funds.

**Publications in Peer-Review Journals**


