

MORE FOR LESS: A NEW TECHNOLOGY IN REHABILITATION ?***Mognoni P.****Institute of Molecular Bioimaging and Physiology, CNR, Segrate, Italy.*

Greater force can be produced during eccentric contractions (Ecc) than during isometric or concentric contractions (Con). Therefore, the training effect of eccentric contractions may cause a greater increase in strength (=MORE). Furthermore, the metabolic cost of Ecc is only 15% of that of Con (=LESS). However, the eccentric exercises for increasing muscular strength are not commonly used as acute Ecc work rates produce profound contraction-induced muscle damage, decrease in maximal isometric force (Fiso) and delayed onset of muscle soreness (DOMS). Standard Monark cycle ergometer may be used for eccentric work by driving backwards by a three-horse power direct-current motor. The resistive power applied by the subject is easily measured.

A training protocol for submaximal Ecc (7 subjects) and Con (6 subjects) has been carried out in which the percentage of maximal heart rate was scaled in 8 weeks to reach 65% as maximal value, i.e. ~130 b/min (1). The training sessions has been increased from 30 min per week to 150 min per week. The training time was on average 1h 40 min per week. In the last week the amount of Ecc work was 4 times higher than that of Con work at similar HR. In the first 3 weeks little pain was noted in Ecc group without any decrease in Fiso. After the 8 week period a significant Fiso increase (+26%) was obtained in Ecc group but Fiso was unchanged in Con group. Muscle biopsies showed an increase of fiber cross sectional area (+52%) in Ecc group and no significant change in Con group. Fast glycolytic fibres were selectively hypertrophied (2).

The response of muscle to eccentric contractions at low training intensities appear to be similar to resistance training. Up to now there is no evidence of an advantage of this particular eccentric training in comparison to classic resistive training.

References

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 - 2. Lieber RL *Skeletal Muscle Structure, Function & Plasticity*, 2nd Edition. Lippincott Williams & Wilkins Publisher, 2002.**
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