



Physiological Changes in Muscles and Nerves Electromyostimulation Training Effects on Neural Drive and Muscle Architecture

Gondin et al. Medicine & Science in Sports & Exercise, 2005, Volume 37(8) pp. 1291-1299.

With electrical muscle stimulation being largely employed as a means of strength training, the authors of this French study wanted to investigate the adaptations that occur in the muscles and nerves that are subject to electrostimulation.

Therefore they divided 20 subjects into an electrostimulated group and a control group.

The EMS group received an 8-week EMS training program of the quadriceps muscles with a [Compex Sport](#) device.

- Maximal muscle strength was increased with 27% after 8 weeks of EMS training – while no strength gains were noted in the control group.
- On the neural level, the authors found that EMS training enhanced the overall activity of the stimulated muscle: the motor nerves are able to activate more muscle fibres with EMS.
- On the muscle level, EMS training produced increased quadriceps muscle mass (measured by cross sectional area of the muscle) and changes towards a more efficient muscle architecture.
- Neural adaptations occurred mainly during the first 4 weeks of training, while muscle adaptations became significant between 4 and 8 weeks of training.

It was concluded that the strength gains with EMS training are associated with neural as well as muscular adaptations.