

Performing cardio- and resistance training during the same session: Does the order matter?

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Although the remarkable benefits of combined training have been clarified by numerous investigations, fitness enthusiasts struggle with the same question: Does the order of cardio- and resistance training influence the effectiveness of a training program?

This question has now been the focus of a series of investigations in the Department of Biology of Physical Activity at the University of Jyväskylä. The international research group led by Professor Keijo Häkkinen and coordinated by PhD student Moritz Schumann has recruited a total of almost 200 recreationally active and healthy men and women as well as endurance athletes during the years 2011-2013 to thoroughly investigate this topic. The first findings of these studies investigating physically active men were recently published in two internationally renowned peer-review Journals.

A novel study design including the investigation of acute exercise responses and chronic training adaptations

The participants of these studies (Schumann et al. 2014a, 2014b) were 18-40 years old men and performed either supervised cardio- immediately followed by [strength training](#) or vice versa for 24 weeks (2-3 combined cardio- and resistance sessions per week). The

researchers were interested to investigate whether the immediate anabolic effects of one single exercise session would differ between the two training orders and whether these differences would be reflected in the physiological adaptations induced by 6 months of training. As prolonged aerobic performance may "weaken" the exercised muscles and essentially reduce the ability to lift heavy loads during the subsequent [resistance training](#) session, the researchers expected to observe less favorable anabolic effects resulting in compromised adaptations in muscle strength and mass in the "cardio first" group compared to the group which started each session with resistance training.

Despite differences in recovery time training order did not affect long-term adaptations

Indeed, this study expectedly revealed that the anabolic responses of one single training session seemed to be less favorable in the training group starting with cardio. This was especially indicated by reduced concentrations of serum testosterone during recovery for up to 2 days, which may possibly be detrimental to optimal muscle growth and strength development. However, this initial difference between the recovery times was no longer observed after the 24-week training period and both groups actually increased physical performance and muscle size to about a similar extent.

The amount and/or frequency of training may play a key role

Based on these findings, the researchers concluded that the training order of combined cardio- and resistance training does not seem to have an effect on biological adaptations, leaving the exercise order up to personal preference. However, since in the early phase of the training the

recovery of the group starting with cardio was prolonged, caution should be paid when performing high amounts and/or a high frequency of training. Performing 2-3 combined cardio- and resistance training sessions per week, of 90-120 min each, does not lead to differences in the adaptations of overall fitness and body composition between the two training orders. However, whether the present results may be ultimately applied to fitness enthusiasts with a longer training history or athletes, typically [training](#) a much greater amount, remains to be investigated.

More information: link.springer.com/article/10.1007/s00421-013-2813-6

journals.lww.com/acsm-msse/Abs...combined.98120.aspx

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