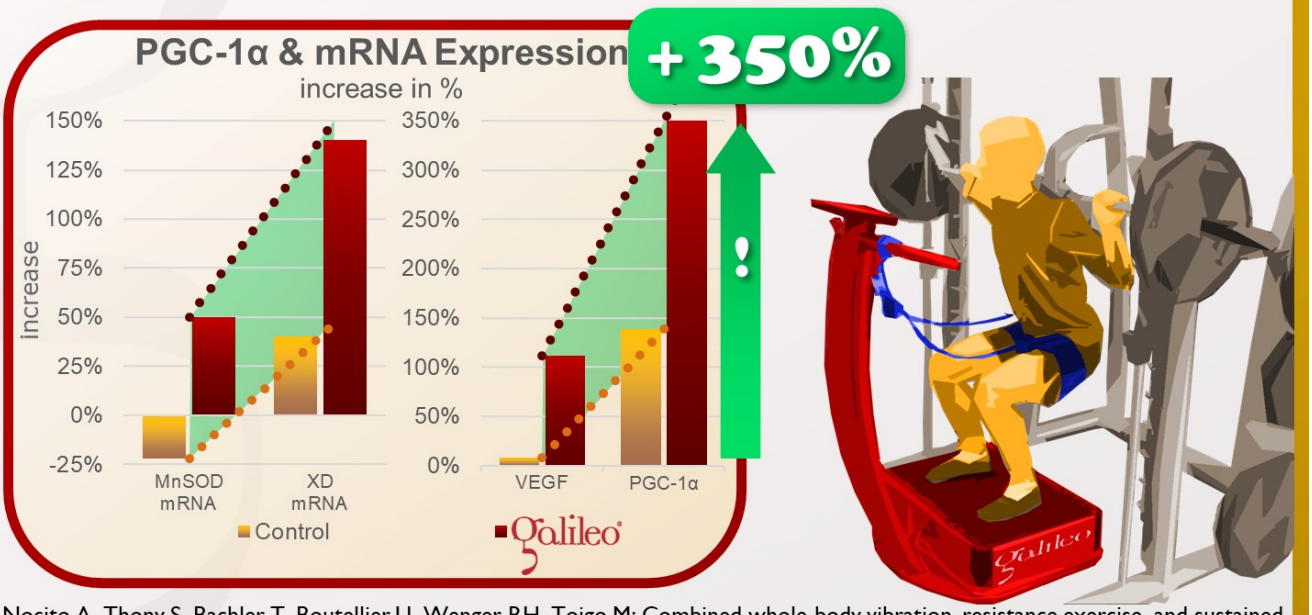
Can Galileo Training + vascular occlusion improve endurance muscles & metabolism ?

The answer is: YES

This study documented the short-term effects (3h post exercise) of Galileo Training + vascular occlusion on endurance muscles in trained endurance runners (30Hz, 90° dynamic squat, +70% 1RM add. load, 2*60s+180s occlusion). The control group received identical training without Vibration and occlusion. The Galileo group showed significantly higher improvements of endurance muscle mRMA and PGC-1α gene expression.



Item F, Nocito A, Thony S, Bachler T, Boutellier U, Wenger RH, Toigo M: Combined whole-body vibration, resistance exercise, and sustained vascular occlusion increases PGC-1alpha and VEGF mRNA abundances.; Eur J Appl Physiol, 113(4):1081-90, 2013; PMID: 23086295; GID: 3355

Galileo Research Fact Sheet #86 Sports & Fitness: Occlusion & Endurance www.galileo-training.com

This study of the group around Marco Toigo at the ETH of Zurich investigated the short-term effects (3h after exercise) of Galileo Training in combination with vascular occlusion (suppression of blood-flow in the legs over several minutes) on endurance muscle-fibers and their metabolism.

Subjects of the study were trained endurance runners. In other publications of the group they showed that this combination is very effective for endurance training (#GRFS11, #GRFS12) and that a single bout already stimulates Satellite cells (#GRFS33).

In this study they focused on cellular changes like the gene expression of TGC-1a (one of the most important activators for the endurance metabolism) as well as the growth of endurance muscle fibers (mRNA expression).

The Effects were measured 3h after 2*60s Galileo Training + 180s vascular occlusion (30Hz, 90° dynamic squats, +70% 1RM extra load).

The control group received identical training without vibration & occlusion. As shown before the Galileo group showed significantly higher effects than the control group (resistance exercise)

- for example the increase in TGC-1a by 350% and the about 3 times higher expression of mRNA (components of the endurance muscle fibers).

Eur J Appl Physiol. 2013 Apr;113(4):1081-90. doi: 10.1007/s00421-012-2524-4. Epub 2012 Oct 20.

Combined whole-body vibration, resistance exercise, and sustained vascular occlusion increases PGC-1α and VEGF mRNA abundances.

Item F[1], Nocito A, Thöny S, Bächler T, Boutellier U, Wenger RH, Toigo M.

Abstract

We previously reported that high load resistance exercise with superimposed whole-body vibration and sustained vascular occlusion (vibroX) markedly improves cycling endurance capacity, increases capillary-to-fibre ratio and skeletal muscle oxidative enzyme activity in untrained young women

These findings are intriguing, since increases in oxidative muscle phenotype and endurance capacity are typically induced by endurance but not heavy resistance exercise.

Here, we tested the hypothesis that vibroX activates genes associated with mitochondrial biogenesis and angiogenesis. Eight healthy, recreationally resistance-trained young men performed either vibroX or resistance exercise (RES) in a randomised, cross-over design.

Needle biopsies (M. vastus lateralis) were obtained at rest and 3 h post-exercise. Changes in relative gene expression levels were assessed by real-time quantitative PCR.

After vibroX, vascular endothelial growth factor and peroxisome proliferator-activated receptor-γ coactivator 1α mRNA abundances increased to 2- and 4.4-fold, respectively, but did not significantly change above resting values after RES. Other genes involved in mitochondrial biogenesis were not affected by either exercise modality. While vibroX increased the expression of hexokinase II, xanthine dehydrogenase, and manganese superoxide dismutase mRNA, there were no changes in these transcripts after RES.

This study demonstrates that high load resistance exercise with superimposed whole-body vibration and sustained vascular occlusion activates metabolic and angiogenic gene programs, which are usually activated after endurance but not resistance exercise.

Thus, targeted modification of high load resistance exercise by vibration and vascular occlusion might represent a novel strategy to induce endurance-type muscle adaptations.

PMID: 2308629