

The CVAC™ Process: Reach Your Performance Peak Faster

- Improved oxygen utilization, glycolytic energy production
- Less wear and tear on the body
- Enhanced recovery time through improved metabolic waste removal

The CVAC™ (Cyclic Variations in Adaptive Conditioning™) Process creates an atmospheric workload which provides the stressors needed to provoke improvements similar to aerobic and anaerobic exercise. The adaptation effect allows an individual to achieve better oxygen utilization, improved glycolytic energy production, and improved metabolic waste removal.

A CVAC session puts on the body a natural and tolerable stress by dynamically cycling physical stressors (barostress (pressure), thermostress (temperature) and transient, pulsatile hypoxic stress. The body reacts to that stress by improving cellular function. The parts of the cell that create energy become stronger and more efficient allowing for improved energy output during future activity (athletics). This same effect occurs during exercise, and is accompanied by muscle tearing, joint stress, and lactic acid build up. CVAC sessions allow an athlete to continue to gain improvement in energy production on the days he/she needs to rest to avoid overtraining.

With the CVAC Process, the work and the recovery occur in sequence. While the cellular energy-making machine is being enhanced, the body is also receiving assistance in eliminating the waste products naturally produced during past intense workouts. With the elimination of that waste, the body unclogs the pipes allowing for ease in elimination of waste production in the next intense exercise session. This elimination process is referred to as lymphatic mobilization. In lymphatic mobilization, plasma proteins and other metabolic waste products are removed. Effective lymphatic mobilization decreases the incidence of inflammation and has positive impact on the body's immune system, endocrine balance, delivery of nutrients and improved breathing.

Adaptation-based physical conditioning versus altitude training

The hypoxic stress component of the CVAC Process is transient, pulsatile and does not compare to the static, long-term exposures to unnaturally lowered oxygen

concentrations associated with nitrogen tents, a popular form of “altitude training”.

The tight relation between arterial oxygen content and maximum oxygen uptake (VO₂ max) within a given person at sea level is diminished with altitude acclimatization. An explanation often suggested for this mismatch is impairment of the muscle O₂ extraction capacity with chronic hypoxia.¹ Due to the transient or pulsatile nature of hypoxia during the CVAC Process, muscle O₂ extraction capacity does not become impaired as it would in a chronic state. But instead, the rhythmical nature of the hypoxic conditions prompted by the unique conditions of the CVAC Process ultimately result in an increase in VO₂ max as seen in pilot studies performed in athletes).

Improved oxygenation in athlete populations

Pilot studies have demonstrated a consistent >5% increase in VO₂ max in athletes whose only change in training regimen has been to introduce CVAC Sessions. In a study at the University of Hawaii, young elite athletes received CVAC Process exposures for 8 weeks. After only 40 hours of CVAC exposure, the athletes experienced on average a 5.2 % increase in VO₂ max. Likewise, an unpublished pilot study out of Stanford University demonstrated the results of four young elite athletes. This study showed, at altitude, a 20% increase in peak power, a 12% increase in SaO₂ (blood oxygen saturation), and an 11% increase in cardiac output with no significant change in heart rate, hematocrit or red blood cells after four 40-minute CVAC Process exposures per week for 8 weeks.

A validation study performed at the University of Hawaii showed that it is potentially the challenge created through the transient (pulsed) hypoxia of the CVAC Process that allows the body to become more efficient at utilizing available oxygen².

1. Maximal exercise and muscle oxygen extraction in acclimatizing lowlanders and high altitude natives. Carsten Lundby, Mikael Sander, Gerrit van Hall, Bengt Saltin, and José A L Calbet; (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1779724/>)
2. Hetzler RK, Stickley CD, Kimura IF, LaBotz M, Nichols AW, Nakasone KT, et al. The effect of dynamic intermittent hypoxic conditioning on arterial oxygen saturation. *Wilderness Environ Med.* 2009;20(1):26-32.

The CVAC technology is intended to provide adaptation-based physical conditioning and is deemed as fitness equipment. The U.S. Food and Drug Administration (FDA) does not

regulate fitness equipment, therefore, it is not approved by the FDA. The CVAC technology is not intended to be used to diagnose, treat, heal, lessen, manage or prevent any disease or other medical condition.

For more information regarding the content of this document, contact: CVACfit@CVACsystems.com.

Copyright © 2014, All rights reserved. Cyclic Variations in Adaptive Conditioning, CVAC and CVAC logos are trademarks or registered trademarks of CVAC Systems, Inc.