

ALTITUDE TRAINING, AN APPROACH TO NEW ENVIRONMENTS



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If you're a fitness enthusiast or trainer who has been searching for the best exercise program to fit your needs, chances are you've tried many variations. Whether for sport or general fitness, we all play with combinations of speed, strength, endurance and flexibility training, not to mention changes in intensity and time. One factor that can be overlooked is environment and - despite changes to programs - most of us will still exercise within our regular park, gym or trail. Considering a change in environment may be the stimulus you need to enhance your current training program.

BY DAVID CLARKE

Used by elite athletes for many years, altitude training is becoming an accessible solution to realise physical improvements fast. And while many sports organisations still run altitude training camps abroad, it has become more convenient and far more cost-effective to use hypoxic (low oxygen) equipment that simulates real altitude. Several sporting organisations now take advantage of simulated altitude environments, including the Australian Institute of Sport, New South Wales Institute of Sport, Aspetar Sports Medicine Hospital and leading NRL and AFL clubs.

WHY ALTITUDE TRAINING?

When the human body is in an oxygen-reduced environment (such as high altitude), it is stimulated to adapt by enhancing the ways it uses oxygen to produce energy. Altitude exposure triggers release of the protein Hypoxia Inducible Factor-1 (HIF-1), which can help to improve the body's efficiency and have a positive impact on combating obesity at a cellular level. Consistent exposure to altitude training helps the body adapt and use energy more effectively – the heart, lungs, muscles and other organs can all benefit.

Typically, altitude training has been used to improve cardiovascular endurance and performance. Hence, it has been popular amongst cyclists and endurance runners. Dufour, Ponsot and others studied two groups of distance runners; one training at sea level, the other at 14.5% O₂ (simulated 3,200m altitude). Training included lower and higher intensity sessions. The simulated altitude group increased VO₂ max and time to fatigue at VO₂ max velocity, with no such changes in the sea level group.¹

More recently, there has been evidence for the benefits of altitude training to deliver significant strength and sprint ability gains. A 2013 published study on cyclists led by the University of Lausanne showed power increases of seven per cent plus a 38% improvement in number of repeat sprints completed at maximum workload after only eight simulated altitude training sessions at 3,000m.²

Perhaps the greatest use of altitude training and the largest opportunity is not simply related to sports performance. The ability

to provide people with an increased metabolic rate workout without heavy load or extreme effort may challenge your current thoughts on HIIT. No doubt high intensity training has earned its place, if not dominance in the current fitness market, but imagine if you could realise similar results by overlaying a different environment and removing the high intensity. Due to the increased metabolic effect of hypoxia, athletes can exercise at a lower intensity for a given stimulus.³ This can reduce the mechanical loading on the body. Altitude training then becomes hugely appealing to anyone who is sedentary, injured or after time-efficient results.

HOW DO I GET STARTED?

Altitude training equipment is not out of reach for any individual. You can purchase portable mask-based equipment for around the price of a quality treadmill. The mask system is certainly a tool that will have you training like a professional. Many of the OricaGreenEDGE cycling team use it abroad and it's perfect for use with most ergos.

It's important, though, not to confuse a portable low oxygen/altitude generator with 'elevation masks'. Such elevation masks have the appearance of biohazard gas masks and work on limiting the supply of air. This is very different to an altitude generator that provides a consistent flow of fresh hypoxic air through the mask – allowing you to exercise safely without fear of carbon dioxide build-up.



There are now a growing number of public fitness facilities that are taking this one step further with fully integrated altitude rooms. The room allows for training as normal without the need for a mask system, and for most feels like any other environment until you begin to work out. Expand your altitude training to strength or plyometric work and you'll certainly challenge the body. Nishimura et al recorded significant muscle hypertrophy and muscle strength gains after a group completed four sets of arm curls at 70% 1RM in simulated altitude for six weeks.⁴ Again, no such changes were apparent in the group training at sea level.

For those looking to train in this new environment, all public altitude facilities will initiate a baseline assessment to determine the right program for you. As with any fitness program there are at-risk groups who might require special protocols or GP approval before starting. Elevated heart rate is an immediate response when at altitude, and this is consistently measured in room along with your blood oxygen saturation level (typically expressed as SaO₂ or SpO₂).

A typical workout could be anywhere between 2,000m and 3,500m simulated altitude. Expect this to be at a reasonably low intensity to begin with. For most, this low rate of exertion is enough to stimulate a drop in your SaO₂ and initiate

changes in the body. And while consistent exposure is best, many facilities offer trial packs to get you started. After an acclimatisation period you can expect to exercise with greater intensity and really challenge your body.

So when you're next looking to step up results, a change of environment may be just as valuable as a change in program. **UFM**

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