

The background of the slide is a blurred photograph of several athletes running on a track. The motion blur is horizontal, suggesting the runners are moving quickly from left to right. The colors are somewhat muted due to the blur, but some red and blue are visible, likely from the runners' uniforms. The overall effect is one of dynamic energy and speed.

High Altitude training (HAT) for athletes

Dr. M. Maleki - Yazdi



Science behind low O₂

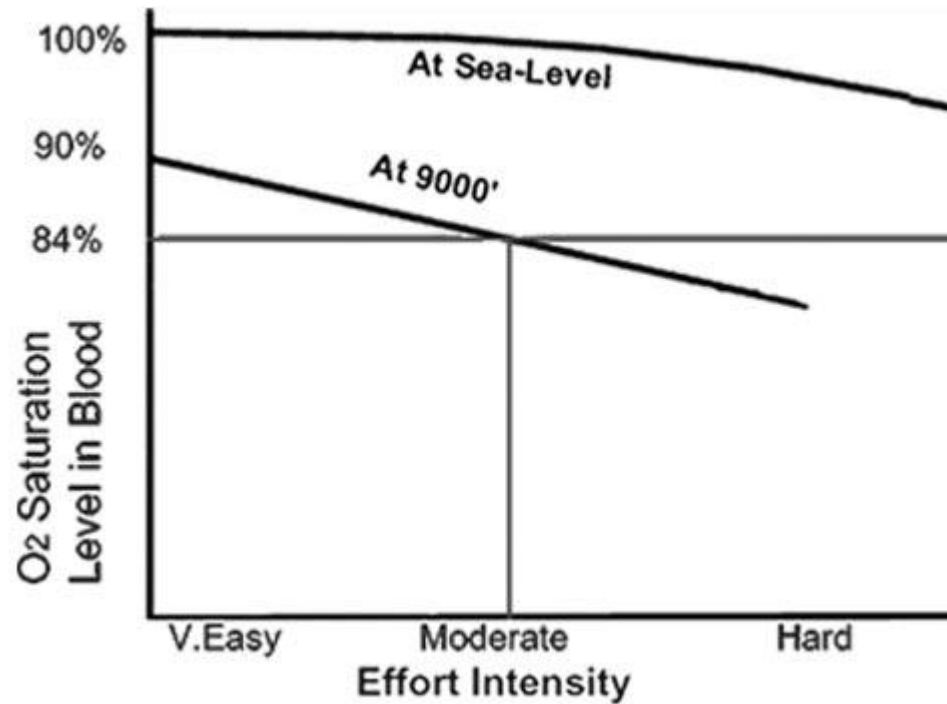
- The theory behind High Altitude Training (HAT) is that if you can adjust your body to perform at competitive levels with less oxygen in your blood and muscles, then when you travel to sea level to compete you should have a higher level of endurance.



Physiologic effects

- Increased EPO levels which leads to increased red blood cell mass.
- Increase oxygen carrying capacity
- Increased VO₂ max.
- Amplified pulmonary oxygen absorption
- Increased capillarization for greater oxygen delivery to the tissues, muscles and brain
- Enhanced production and rejuvenation of mitochondria

Graph Physio





Proven Benefits

- Increased $\dot{V}O_2$ max (max rate of oxygen usage)
- Enhanced power output and speed
- Improved strength and endurance
- Increased exercise-till-exhaustion (ETE) time
- Reduced recovery time after exertion
- Decreased resting heart-rate and blood pressure
- Maintenance of cardiovascular fitness when injured
- Diminished overall fatigue

Research

- In this breakout study done with a group of equally trained runners, the groups who trained at altitude significantly **increased V02 max by 5%** with a direct correlation to a **9% increase in red blood cell volume**, whereas a control group who trained only at sea-level showed no such changes. In conjunction, the “live high, train low” group showed the largest improvement in 5000m run time over both the control (live low, train low) and the other experimental group (live high, train high)

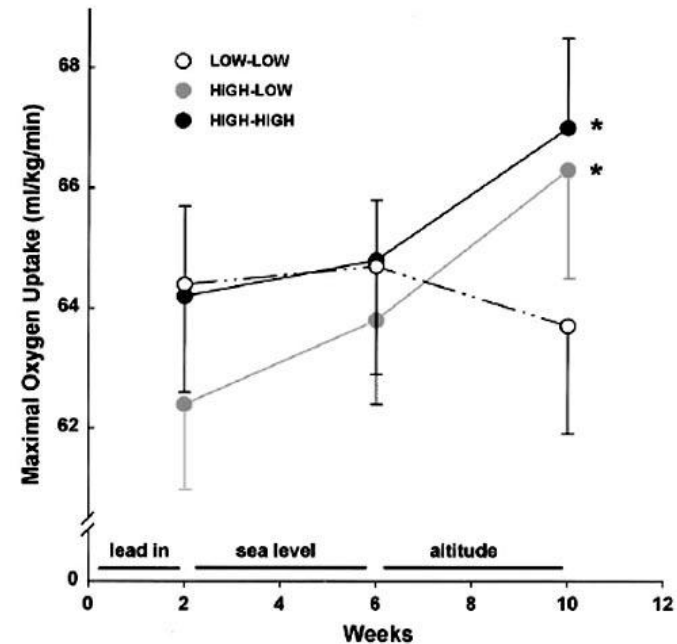


Fig. 3. Maximal oxygen uptake at baseline after sea-level training in Dallas (sea level) and after altitude training camp or sea-level control (altitude). Group characteristics and figure symbols are defined as in Fig. 2. * $P < 0.05$ compared with previous time point.

Altitude trainer



- 8000 \$
- small size – requires less than 2ft² of floor space
- User friendly operation: power switch + mask = altitude
- Affordable – a fraction of the cost of the Altitude Chamber
- Compatible with high-altitude adapter
- 115L/min of airflow, adjustable to altitude of 12,000ft/3660m

Exercise mask kit



- 297.17 \$
- Enables workouts at altitudes of up to 12,500ft/3800m
- Automatically adjusts to hyperventilation by lowering the simulated altitude

Altitude chamber



- 15000
- Extremely user friendly – just walk inside
- Allows for multiple simultaneous users
- Air-conditioned and HEPA filtered
- No discomfort associated with old fashioned Hypobaric chambers
- Normal humidity prevents early dehydration



