



The risk of sports at altitude: hypoxia

For athletes and coaches

The effects of altitude on the body:

- From 0 (sea level) to 1000 meters: no reaction
- From 1000 to 2000 meters: effects felt during exercise for intense efforts or ill-prepared people physically
- From 2000 to 5000 meters: effects felt at rest and even minor effort
- From 5000 meters to 8848: effects felt permanently and very difficult life without acclimatization.

Exposure to high altitudes (above 2,500 meters) and lack of oxygen causes the body to take action and adapt with a series of cardio respiratory adaptations to maintain sufficient oxygenation in all organs. Three pathologies are related to the lack of oxygen specific to altitude:

1: Acute Mountain Sickness (AMS)

It is defined by the appearance of various symptoms, the main ones being headaches, shortness of breath, fatigability, loss of sleep and nosebleeds in an unacclimated person. This could appear a few hours after arriving at an altitude above 2500 m. We can also find nausea, vomiting, decreased amount of urine and localized edema of the face and hands.

This acute mountain sickness is not a fatal disease in itself, but it can cause a runner to fall, lead to poor performance and abandonment. Dehydration and poor nutrition can be caused by these symptoms and therefore have more serious consequences such as hypothermia or hypoglycemia.

The treatment like paracetamol, aspirin and acetazolamide can be used. Acetazolamide is part of a doping substance and cannot be taken during competition.

2: High-Altitude Pulmonary Edema (HAPE)

It is a vital emergency that occurs 36 to 72 hours after arrival at high altitude. It is characterized by dyspnea at rest (trouble breathing), tachypnea i.e. increased respiratory rate, dry cough, often with pink sputum and feverish condition. The deterioration is very rapid but can be treated by descending from altitude. The mortality rate is high in the absence of treatment.

The treatment, apart from descending, consists in using pulmonary vasodilators accompanied by oxygen and compression.

3: High-Altitude Cerebral Edema (HACE)

This pathology is characterized by ataxia, impaired coordination and altered state of consciousness that can lead to coma and death. It is also a vital emergency that requires immediate descent.

Oxygen, a compression chamber and the administration of medication (corticosteroids, mannitol, ...) can save time if the descent is impossible to implement immediately.

Finally always think that a certain number of diseases (pulmonary, neurological, endocrinological, hematological, etc.) which preexist may worsen during exposure at high altitude or predispose to one of the 3 pathologies described.

Advice :

- Do not climb too fast
- Prepare for an altitude competition by going up a little lower altitude (for example: repeat 3 times 4000 m before climbing Mont Blanc)
- Having already a high altitude experience reduces the risks
- Living year-round at around 900m altitude also reduces the risks
- Do not stay aloft for too long

There are absolute and relative contraindications which must be determined by a compulsory medical examination pre race :

Absolute contraindications:

- Coronary heart disease
- Severe hypertension
- Heart rhythm disorder
- Cyanogenic heart disease
- Pulmonary arterial hypertension
- Chronic respiratory failure
- History of cerebral ischemia
- Arteriopathy of the lower limbs
- Coagulation disorders
- Homozygous sickle cell anemia
- Renal failure
- History of high altitude pulmonary or cerebral edema

Relative contraindications:

- Severe scoliosis
- Asthma
- Epilepsy
- Migraine
- Pregnancy (especially in the 3rd trimester)
- Heterozygous sickle cell anemia.

Finally, it is possible to carry out a hypoxic test during a medical visit prior to an altitude race: allows you to see the pulmonary reactivity linked to the lack of oxygen.

For athletes:

Before the competition:

- Make a medical visit with a hypoxia tolerance test
- Train regularly at altitude (above 3000 meters) in the 3 months before the competition
- Arrive at the start of the race 4 days before the start for acclimatization.

During the competition:

- Have an oximeter to check the saturation (which must be greater than 80%)
- Make a very slow start
- Climb in stages if possible and stopping to assimilate the different altitude levels
- Hydrate more than usual
- Consume more carbohydrates than usual

TESTER L'ÉQUIPEMENT



Je teste toujours mon équipement, mon plan d'hydratation et de nutrition à l'entraînement avant de les utiliser en compétition.

L'HYDRATATION



Je bois à la sensation de soif et mange salé au goût pour éviter l'hyperhydratation et la déshydratation.

CONDITIONS ENVIRONNEMENTALES



J'anticipe et me prépare aux conditions environnementales extrêmes lors de l'exercice.

SOUSCRIRE À UNE ASSURANCE



Je souscris à une assurance adaptée aux risques de la pratique de mon sport (Couverture des frais d'hélicoptère).