

High Altitude Acclimatization

- **Process of body adjusting to the decreased availability of oxygen at high altitude**
- **It's a slow process**
- **Takes place over a period of days to weeks**



Why low Oxygen at high altitude?



- Because air is compressible, the weight of all the air above us compresses the air around us, making it denser. As you go up a mountain, the air becomes less compressed and is therefore thinner. That is to say, air pressure drops as one goes up.
- At sea level, Oxygen % in the air is 21. The important thing is **even at the top of Mt. Everest, Oxygen % in the air is 21!!** so why is there so much of **fuzz about less Oxygen at altitude?**
- As one attains higher altitudes, air density reduces. That means, amount of available air in a given space decreases. **But when overall air density reduces, it naturally means the Oxygen content also reduces; even if it's % in the air remains same.**

Blood & Oxygen saturation



- At altitude roughly below 2500 m, there is no much physiological changes in human body.
- Altitude starts kicking in as one goes suddenly above 2500 m. or do not take proper care of one's health. This results in poor supply of Oxygen to the blood cells
- At high altitude, body deals with the decreased oxygen by breathing faster and deeper even when your resting, so as to compensate the less Oxygen intake per breath.

High Altitude Challenges



- **AMS** : Stems from rising in altitude too fast where the levels of available oxygen are far lower
- **HAPE** : HAPE occurs when fluid leaks into your lungs through the capillary wall
- **HACE** : HACE occurs when there is dangerous swelling of the brain
- AMS, if not treated in time, can subsequently develop into either HAPE or HACE
- Both conditions are extremely dangerous and usually occur from ascending too quickly or spending too long at high altitude

Symptoms for AMS

Mild	Moderate	Severe
Headache	Vomiting	Severe Headache
Fatigue	Persisting Headache	Inability walk
Nausea	Decreased coordination	Fainting
Loss of Apatite	Weakness	Shortness of breath during rest periods
Loss of Sleep		

Golden Rule 1: If you feel unwell at altitude, it is altitude sickness unless proven otherwise

Golden Rule 2: Never Ascend with symptoms of altitude sickness

Golden Rule 3: If you are getting worse, get down at once

Can AMS be Fatal?

- Not AMS!!
- But if it is not treated in time, it develops into either **HACE** or **HAPE**, which can surely become fatal!

So what to do to avoid this??

- Drink plenty of water (Keep hydrated)
- Walk slow at steady pace
- Climb high, sleep low

- **Diamox medication!!??**



If the AMS doesn't recover, then **Descend** is the only option!

At high altitude, with every breath, less oxygen reaches your blood and increased breathing builds up carbon dioxide in the blood. But as you climb higher your body acclimatizes naturally to the decreasing oxygen and copes up even as you climb higher. However, when the build up of carbon dioxide is beyond one's capacity to tolerate, it causes sickness. This is AMS.

Diamox works by increasing the acidity in our blood.

The drug forces kidneys to excrete bicarbonate, (base form of carbon dioxide) This causes one to urinate more, reacidify the blood and thus balances the effect of hyperventilation that occurred due to rapid breathing in order to get more Oxygen. This process is a stimulant for more breathing and thus leads to accelerated acclimatization (**remember it doesn't cure anything**).

So the bottom line is, if Diamox is to be consumed (only after consultation), one should ensure proper rehydration or else, the drug may cause side effects such as dizziness due to dehydration, kidney stones, numbness in fingertips, changed taste.

Misconceptions

- **Misconception 1 : Good fitness keeps AMS at bay.**
- **Truth: Fitness has nothing to do with one's ability to acclimate. Its genetic. Even though, good fitness can help acclimate easier, it cannot assure AMS free ride**
- **Misconception 2 : Diamox will prevent AMS from worsening during ascent**
- **Truth: IT DOES NOT PROTECT AGAINST WORSENING AMS WITH CONTINUED ASCENT.**
- **Misconception 3 : Alcohol keeps you warm and help acclimate better**
- **Truth: Alcohol is a vasodilator. Meaning that consumption of alcohol causes peripheral veins to dilate and lets more blood to circulate in the peripheral body keeping the core body deprived of blood. This gives false sense of warm feeling, while the core muscles heart, lungs become vulnerable to cold.**

Final thoughts

- Walk slow
- Keep hydrated
- Climb high, sleep low
- Keep a check on O2 saturation (In general, O2 saturation index (SPO2):
SPO2 > 90% = 😊; **80% < SPO2 < 90% = 😐**; **SPO2 < 80% = 😞**)
- Take Diamox only in case if rapid ascend is unavoidable!!
- In case the situation doesn't improve, DESCEND!! Mountain will still be there next time. You should turn around **ALIVE** to come back next time

