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Emergency oxygen when you need it.™

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This brief is one in a series of non-technical articles that discuss bystander delivery of oxygen during breathing emergencies

Super-Charged Oxygen Therapy

Our lungs function so well that we rarely need to give them a second thought. Day in and day out our lungs automatically ensure that our bodies are receiving life-giving oxygen. Our lungs work so well because they have adapted to our natural surroundings. For certain medical conditions, however, we need to artificially change our environment in order to *supercharge* the life-giving properties of oxygen.

Team Players: Your Heart and Lungs

If you are reasonably healthy then you may notice your breathing only when you participate in a sport or climb a couple flights of stairs. When your body needs more oxygen your lungs automatically increase the rate and depth of your breath as your heart rate increases.

Your lungs and heart work together seamlessly. With each breath your lungs extract oxygen from the air and transfer that oxygen to your blood. You heart pumps this oxygen-rich blood to all your organs, including your brain. When the teamwork of the lungs and heart breaks down, the body is deprived of oxygen and long-term injury or death can occur in less than 15 minutes.

The Weight of Air

Part of the reason that your lungs work so well is due to the weight of air around you. Gaze up at the stars and you are looking through some 300 miles of atmosphere over your head.[i] Stand on the beach of any major ocean and those miles of air bear down on you with almost 15 pounds of pressure per square inch. This pressure ensures that the air around you contains about 21% oxygen. The pressure is also high enough to force air into your lungs when you breathe in and low enough for your lungs to push a breath back out before breathing in again.

As you move to higher and higher places the air becomes thinner and thinner, the pressure around you drops as does the amount of oxygen in the air. Go high enough – like people who climb Mt. Everest – and you'll likely need a portable oxygen tank to ward off dangerous effects of low oxygen.[ii]

The Power of Pressure

We know from literature and movies how artificial environments are created when people travel into hostile environments. Deep sea diving bells and the Space Station are just two examples of how a safe environment can be created to sustain life. These devices ensure that a normal amount of pressure and oxygen is maintained in the air so the lungs and heart can do their job.

On land, so-called hyperbaric chambers[iii] are used in a variety of settings to deliver specialized oxygen therapy.

High altitude mountain climbers often carry a device called a Gamow bag that is like a sleeping bag but can be pressurized to help create a more normal pressure around a victim and stave off lung and brain damage.

Hospitals also use hyperbaric chambers like the one shown at right. These chambers create higher than normal pressure around the patient as she breaths higher than normal levels of oxygen. This combination of high pressure and high oxygen elevates the amount of oxygen in the blood to treat dangerous medical conditions like gangrene, deep bone infection and non-healing wounds like diabetic foot ulcers.

Portable Emergency Oxygen

Most people will never require treatment in a hyperbaric chamber. At the same time, there are **over 7 million breathing emergencies every year** where the administration of oxygen can provide support until professional emergency services (EMS) arrive on scene.

The R15 portable emergency oxygen device is specifically designed for such breathing emergencies. Further, the R15 device is cleared by the Food and Drug Administration (FDA) for use by anyone during a breathing emergency. In three simple steps the R15 device safely delivers 100% oxygen for 15 minutes which is about twice the average amount of time it takes for EMS to arrive to an emergency after 911 is called.

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[i] Earth's Atmosphere: Composition, Climate & Weather, Tim Sharp, October 13, 2017 [online 4May19> https://www.space.com/17683-earth-atmosphere.html

[ii] Oxygen at high altitude, Andrew J Peacock, BMJ. 1998 Oct 17 [online 4May19> https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1114067/

[iii] Hyperbaric oxygen therapy, Mayo Clinic [online 4May19> https://www.mayoclinic.org/tests-procedures/hyperbaric-oxygen-therapy/about/pac-20394380