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## Research in Graubünden

### Health Effects of High-Altitude Air

How Sleep, Altitude, and Research Come Together



Effective sleep apnea treatment despite high-altitude air.

Photo: Adrian Ritter

Altitude has fascinated scientists for many decades. The Hochgebirgsklinik Davos focuses specifically on how people can live, sleep, and breathe at high altitudes. The research centers on how high-altitude air affects the human body. Davos offers unique conditions for this purpose. The high altitude creates a natural alpine research environment for studying the effects of oxygen deprivation on healthy individuals as well as on patients.

Scientific studies conducted on healthy individuals at moderate altitudes have

shown that the thin air in Davos reduces nighttime oxygen supply, makes breathing more irregular, and causes measurable changes in sleep, such as more frequent awakenings or shorter periods of deep sleep. Despite subtle changes in sleep architecture, alertness and psychomotor performance remained largely stable during the day. Studies also show that moderate altitude can worsen sleep apnea by increasing the frequency of breathing pauses and impairing oxygen supply. Fortunately, these changes can be treated. For health reasons, it is therefore recommended to use Continuous Positive Airway Pressure (CPAP) therapy during the night while at high altitude, possibly in combination with acetazolamide. CPAP therapy continuously generates mild positive pressure via a breathing mask, keeping the airways open and preventing breathing pauses. Acetazolamide is a medication that stimulates breathing and helps the body adapt to altitude. This can improve oxygen saturation and sleep quality, as well as achieve adequate correction of sleep apnea.

Patients with chronic obstructive pulmonary disease (COPD) are also more likely to experience oxygen desaturation, reduced sleep quality, and impaired performance at high altitudes. Oxygen therapy can significantly improve oxygen supply, stabilize nighttime breathing patterns, and reduce the strain on the heart. “Our research thus shows that even people with chronic lung diseases can safely enjoy stays at high altitudes,” says PD Dr. Tsogyal Daniela Latshang, Chief of Pulmonology at the Hochgebirgsklinik Davos. “Provided that treatment and preparation are tailored to the individual.”

Many research questions arise directly from clinical observations and specific issues encountered in everyday medical practice. Current research is particularly focused on the effects of sleep on rehabilitation and the impact of altitude on sleep studies. The Davos Medical Campus offers ideal conditions for this. The translational approach—spanning physiological mechanisms, clinical studies, and concrete treatment recommendations—uniquely bridges research and clinical medicine and contributes to the continuous advancement of high-altitude medicine and sleep medicine.

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