

High-altitude climbs may cause corneal swelling, but do not appear to affect vision

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Swelling commonly occurs in the corneas of mountain climbers, but does not appear to affect vision at altitudes of up to 6,300 meters (about 20,670 feet), according to a report in the February issue of *Archives of Ophthalmology*.

"High-altitude mountaineering is a popular recreational sport among healthy lowlanders," the authors write as background information in the article. "As a consequence of the exposure to hypobaric atmospheric conditions with a consecutive decrease in <u>oxygen saturation</u>, high-altitude climbing may lead to acute mountain sickness and the rare but potentially fatal high-altitude cerebral edema." Changes to the cornea, the transparent membrane covering the front of the eye, also occur during high-altitude climbs and may cause potentially hazardous <u>vision</u> loss.

Martina Monika Bosch, M.D., of University Hospital Zurich, Switzerland, and colleagues studied the effects of high-altitude climbing on corneal thickness among 28 healthy volunteers climbing Mount Muztagh Ata in western China. The mountaineers were randomly assigned to two different ascending paths, with one group being allotted a shorter time to acclimate before ascending to 6,265 meters. Corneal thickness, visual acuity and blood oxygen levels were measured in climbers before, during and after their ascent, and symptoms of acute mountain sickness were also assessed.

In groups with both patterns of ascent, corneal thickness increased with



increasing altitude and decreased after descent, and the amount of decrease in blood oxygen levels paralleled this increase. The group with the shorter acclimatization time experienced a greater increase in corneal thickness. However, no significant decrease in visual acuity was observed in either group.

When controlling for age and oxygen saturation, there was a correlation between symptoms of mountain sickness and corneal thickness. This was possibly due to these individuals' higher overall susceptibility to inadequate oxygen supplies.

The exact cause of corneal swelling during ascent remains controversial, the authors note. The current findings suggest that the body's delivery of oxygen to the aqueous humor—the fluid inside the eyeball, between the cornea and iris—may be more important in corneal oxygen levels than previously thought.

"It seems that visual acuity in healthy <u>corneas</u> is not adversely affected despite the presence of edema at altitudes up to 6,300 meters," the authors conclude. However, it is likely that ascents to more extreme altitudes—above 8,000 meters or about 26,000 feet—may induce greater damage to the cornea and lead to dangerous visual loss.

More information: Arch Ophthalmol. 2010;128[2]:184-189.

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