The Mont Blanc Study: The effect of altitude on intra ocular pressure and central corneal thickness

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The aim of the Mont Blanc Study was to investigate the relationship between intraocular pressure (IOP) , central corneal thickness (CCT) , and altitude in healthy subjects. Thirty-three eyes of 33 healthy volunteers (mean age: 24.8 years, 17 females) had their IOP measured with Perkins and I-Care tonometers and their CCT using ultrasound pachymetry at three locations in Italy with different altitudes: Pavia, (PV) , 77 meters above sea level (a.s.l) ; Courmayeur (CM) , 1300 meters a.s.l; Pointe Helbronner (PH) , 3466 meters a.s.l.) . The measurements were performed at 9 am, 11 am, 1 pm and 3 pm (±30') in indoor settings (mean temperature of 19°C) in PV and PH. At 9 am, CCT and IOP were measured outdoor (mean temperature of -1.4°C) at PH. The mean values of the IOP curve decreased from PV to PH with the Perkins ($p = 0.02$) and I-Care tonometers ($p = 0.001$) . Instead, CCT increased upon ascension from PV to PH ($p = 0.01$) , and from CM to PH ($p = 0.002$) . When exposed to sub-zero temperature, the IOP increased ($p<0.001$) , while the CCT did not change ($p = 0.30$) . The results suggest that IOP significantly decreased and CCT significantly increased upon ascension from the sea level to higher altitudes.

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