

# Review of: "Physiological Adaptation to Altitude: A Comparison of Fast and Slow Ascents to 5,300 m Above Sea Level"

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Potential competing interests: No potential competing interests to declare.

The present paper examined the effects of days to ascend to the altitude of 5,300 m. The comparison was made between the cases of actual mountaineering at Mount Everest and Mount Kilimanjaro. The former case took 8 days from the altitude of 2,300 m to 5,300 m (13 volunteers). The latter case took 4 days for the mountaineering at equivalent altitudes (the other 7 volunteers). Resting heart rate and pulse oximetry, symptoms of acute mountain sickness, and medication were recorded during the mountaineering. In comparison with the case of fast ascent, slow ascent was characterized by milder oxygen desaturation and tachycardia, fewer symptoms of mountain sickness, and less medication. The authors concluded that rates of ascent should be carefully considered when climbing to altitudes at or above 5,000 m.

I respect the efforts given by the volunteers and the authors. The results could contribute to considering the strategy for ascending high altitudes safely. To improve the quality of the paper, I suggest the following points.

1. Due to the small number of subjects, the authors should discuss the results in detail, looking at the personal data across measured parameters. For example, in the slow ascent group, did the volunteers taking acetazolamide reveal fewer symptoms and higher values in pulse oximetry?
2. The authors should describe the high-altitude experience of the volunteers. As susceptibility to altitude illness shows interindividual variability, high-altitude experience is a significant factor related to susceptibility to altitude illness. If high-altitude experiences were different among the volunteers, some discussions are required on this point.
3. Since the present study examined the rates of ascent on physiological responses and altitude illness, related introductions and/or discussions such as introducing the guideline for rate of ascent, individual differences in high-altitude acclimatization, and possible factors affecting safe ascent rates, are desired.
4. Lake Louise score, which is introduced by the authors in the first paragraph on page 7, is a parameter to quantify the degree of altitude illness. Did the authors not measure the Lake Louise score in the present study?
5. Were the medications shown in Table 2 decided by an attending medical doctor or the volunteers themselves?
6. Were the symptoms shown in Table 1 determined by an attending medical doctor or the volunteers themselves? According to the description on page #7, one person in the fast ascent group exhibited features of early HAPE. In Table 1, two persons suffered from severe breathlessness in the fast ascent group. How was early HAPE diagnosed?
7. Four and five volunteers in the slow and fast ascending groups, respectively, suffered from polyuria at an altitude of 3,800 m (Table 1). Since polyuria is a major side effect of taking acetazolamide, did the authors find any relationship

between polyuria and taking acetazolamide?

8. According to the descriptions in the Methods section and the clothes shown in the photographs, the ambient temperature on Everest seems to be colder than that on Kilimanjaro. Did the authors have any discussions on this point?
9. The present paper includes no ethics statement. Was the data collection conducted without informed consent?

Finally, I introduce 2 papers that are useful for writing the introduction and discussion.

1. Luks AM. Clinician's corner: what do we know about safe ascent rates at high altitude? *High Alt Med Biol* 2012; 13: 147–152.
2. Luks AM, Swenson ER, Bärtsch P. Acute high-altitude sickness. *Eur Respir Rev*. 2017 Jan 31;26(143):160096. doi: 10.1183/16000617.0096-2016. Print 2017 Jan.