

Intermittent simulated hypoxia for pre-acclimatization

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Pre-acclimatization in hypoxic chambers is a new strategy to prevent high-altitude disorders during high-altitude exposure. As a matter of fact pre-acclimatization is requested in the wide range of tourism activity (source: <http://www.hauser-exkursionen.de>) instead of spending extra days on site in order to acclimatize following well established protocols [1, 2]. The assessment of this is discussed controversially and every physician familiar with high-altitude medicine has to decide if he is willing to support this. There is a wide range of high-altitude activity illustrated in the article by Küpper et al. [3]. Even if one initially thinks that pre-acclimatization is of no relevance for trekkers and mountaineers, actually, real altitude profiles especially exist in commercial offers (e.g., Kilimanjaro in 4 days; source: <http://www.moja-travel.net>). Nevertheless, acclimatization on site offers several advantages (testing material, team building, adaption to the environment, and nutrition...) that justify the additional time needed. In case of skiers in ski resorts at high altitude, e.g., Colorado, acclimatization is even more difficult because of missing capabilities and acceptance among the tourists. But in this special case medical support and a fast descent is always

feasible in situations of high-altitude disorders, which makes un-acclimatized travel acceptable, even if skiing pleasure might be compromised. A proper acclimatization is of great importance for professional engagement at high altitude; however a step by step adaption process over several days seems to be more a hope than reality. In case of rescue and military [4] operations at high altitude, the exposition time and duration is often unknown and the subjects are not able to terminate the altitude stay by their own. Hypoxic chambers might be a solution to have staff prepared to leave for such missions.

In general, pre-acclimatization requires a defined amount of time, too. This opens the question if staying (and acclimatize) at the scene in the real environment makes more sense instead of spending this time in a hypobaric chamber. But recent investigations report beneficial effects from exposure times of only 1–4 h per day over 1–5 weeks to simulated altitudes of about 4,000 m [5]. If these results are confirmed, a new dimension of acclimatization is at hand, for example, by simply spending the nights in a hypoxic chamber. And this would offer a new strategy in the above-mentioned situations. Up to now, these findings are discussed controversially, especially because there is no established protocol yet for acclimatization in interrupted hypoxia. Thus Küpper et al. (see above) report the current state of knowledge and they recommend a scheme for interrupted pre-acclimatization in a hypoxic chamber. Considering the findings above, the conclusion/statement seems conservative but shows the authors a careful approach. The step-by-step development of a reliable and safe procedure for acclimatization in a much shorter timeframe opens a field of important research. Hopefully, their article initiates the required investigation efforts with solid results presented in the near future.

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