Title: Effects of hyperbarism on central respiratory drive and respiratory pattern in humans.

Authors: Rocco, M
Pelaia, P
Conti, G
Malpieri, R
Cottini, F
Bortone, C
Gasparetto, A

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Abstract: The aim of our study was to evaluate the effects of increasing pressure (from 1 to 3 and 6 atm abs) on respiratory drive, respiratory pattern, and inspiratory impedance of the respiratory system. Seven healthy volunteers were studied during a dry compression to 6 atm abs in a hyperbaric multiplace chamber. We observed a significant increase in tidal volume, P0.1 (the pressure generated in the airway after 100 ms of inspiration against a closed inspiratory line), Ttot, and Ti, and a significant respiratory rate reduction with increasing pressure from 1 to 3 atm.abs; P0.1 also increased significantly when comparing 3 and 6 atm abs measurement with 1 atm abs. The P > 0.01 and P0.1/(VT/Ti) showed a significant progressive increase compared with 1 atm abs. In conclusion, the passage from 1 to 3 and 6 atm abs causes, in healthy subjects at rest, an increase in the central respiratory drive activity, evaluated with P0.1 measurement. The response to the respiration system is an increase in tidal volume and Ti with a decrease in respiratory rate.

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