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

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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, $P_{0.1}$ (the pressure generated in the airway after 100 ms of inspiration against a closed inspiratory line), T_{tot} , and T_i , and a significant respiratory rate reduction with increasing pressure from 1 to 3 atm.abs; $P_{0.1}$ also increased significantly when comparing 3 and 6 atm abs measurement with 1 atm abs. The $P > 0.01$ and $P_{0.1}/(VT/T_i)$ 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 $P_{0.1}$ measurement. The response to the respiration system is an increase in tidal volume and T_i with a decrease in respiratory rate.

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