Title: Inspiratory flow limitation in divers

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Abstract: Inspiratory dyspnea becomes an important factor in reducing a diver's ability to carry out physical work at depths in excess of 300 m. It is possible that dynamic compression of the trachea occurs when the intratracheal pressure drops below environmental pressure, thereby causing transient reduction in inspiratory flow. Vocal cords form an orifice of variable diameter, and orifice flow is predicted to occur at flow rates as low as 22 liter/min when gas density is 5 kg/m3 or more. Pressure drop across the vocal cords is calculated to range from 70 N/m2 at flow rate 1 liter/sec to 2.8 kN/m2 flow rate 4 liter/sec, aperture of the vocal cords 1.2 X 10(-2) m, gas density range 5-10 kg/m3. A smaller aperture, 0.6 X 10(-2) m, results in a pressure drop range 1.29-41.15 kN/m2 for the same flow rates and density range. Thus the transmural pressures that can occur are high enough to cause tracheal compression. At 300 m, gas density 5.9 kg/m3, 3 of 4 divers showed evidence of sudden inspiratory flow limitation.

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