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**Title:** Influence of hydrostatic compression of the chest and intrathoracic blood pooling on static lung mechanics during head-out immersion

**Authors:** Dahlback, GO  
Jonsson, E  
Liner, MH

**Keywords:** human  
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**Abstract:** The effect of water immersion on static lung volumes and pressure-volume curves was studied in five subjects. A special container allowed measurements during nonimmersion, head-out immersion, and thorax immersion leaving the head, pelvis region, and legs dry. It was thus possible to separate the part played by hydrostatic forces acting on the chest from the part played by intrathoracic blood pooling during immersion. Hydrostatic compression of the chest decreased total lung capacity (TLC) by 0.30 liter and residual volume (RV) by 0.25 liter. Blood redistributed into the thorax during head-out immersion caused a further reduction of TLC of 0.13 liter; RV increased by 0.10 liter, probably because expiration was hampered by air-trapping. Head-out immersion reduced VC by 0.29 liter compared to nonimmersion, and this effect was wholly attributable to intrathoracic blood pooling. Lung compliance during head-out immersion was 0.11 liter x (cmH<sub>2</sub>O)<sup>-1</sup> smaller than during nonimmersion; this was mainly due to intrathoracic blood pooling. Results support the notion that blood redistribution decreased lung compliance by exerting an erectile effect on the lung tissue. Adult Human Hydrostatic Pressure/\*adverse effects \*Immersion Lung/\*physiology Lung Compliance Lung Volume Measurements Male Middle Aged Pressure/\*adverse effects \*Regional Blood Flow Thorax/blood supply

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