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Human Regional Pulmonary Gas Exchange with Xenon Polarization Transfer (XTC) IGA MURADIAN, JAMES BUTLER, MIRKO HROVAT, GEORGE TOPULOS, ELIZABETH HERSMAN, IULIAN RUSET, SILVIU COVRIG, ERIC FREDERICK, STEPHEN KETEL, F.W. HERSMAN, SAMUEL PATZ — Xenon Transfer Contrast (XTC) is an existing imaging method (Ruppert et al, Magn Reson Med, 51:676-687, 2004) that measures the fraction F of ^{129}Xe magnetization that diffuses from alveolar gas spaces to septal parenchymal tissue in lungs in a specified exchange time. As previously implemented, XTC is a 2-breath method and has been demonstrated in anesthetized animals. To use XTC in humans and to avoid issues associated with obtaining identical gas volumes on subsequent breath-hold experiments as well as precise image registration in post-processing, a single breath XTC method was developed that acquires three consecutive gradient echo images in an 8s acquisition. We report here initial measurements of the mean and variance of F for 5 normal healthy subjects as well as 7 asymptomatic smokers. The experiments were performed at two lung volumes (~ 45 and 65% of TLC). We found that both the mean and variance of F increased with smoking history. In comparison, standard pulmonary function tests such as DLCO FEV1 showed no correlation with smoking history.

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