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**Title:** Does the parenchyma mediate the ability of one airway to modulate the contraction of another?

Dr. Baoshun 20397 Ma [bma@uvm.edu](mailto:bma@uvm.edu)<sup>1</sup> and Dr. Jason 20398 Bates [jason.h.bates@med.uvm.edu](mailto:jason.h.bates@med.uvm.edu)<sup>1, 1</sup>  
Medicine, University of Vermont, Burlington, VT, United States, 05405-0075 .

**Body:** If two airways are sufficiently close, the parenchymal distortion forces between them may interfere with their abilities to narrow. This mechanism may act to homogenize airway narrowing throughout the lung. We investigated this in a 2-dimensional computational model of a pair of airways embedded in parenchyma represented as a linear elastic continuum (Fig. 1a).

Airway contraction was achieved by imposing an inward radial force on the hole boundaries and calculated using the finite element method. We determined how airway lumen area was affected as a function of the separation distance between their centers when only one airway contracted versus when both airways contracted equally. We found that airway contraction was identical under both conditions until the two airways came within about 2 uncontracted diameters of each other (Fig. 1b) at which point a contracting airway narrowed less if its companion airway also narrowed. We also found that when airways were close they narrowed more than when they were far apart, no doubt due to the reduced parenchymal interdependence forces caused by the hole representing a nearby companion. These model results suggest that airway-parenchymal interdependence will only significantly affect the heterogeneity of airway narrowing if the airways are, on average, within about 2 diameters of each other, provided that the parenchyma behaves like an elastic continuum.