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Non-Newtonian Flow-Induced Deformation From Pressurized Cavities in Absorbing Porous Tissues AFTAB AHMED, Capital University of Science and Technology, Islamabad, Pakistan, JAVED SIDDIQUE, Penn State University—York Campus, York, Pennsylvania 17403-3326, USA — We investigate the behavior of a spherical cavity in a soft biological tissue modeled as a deformable porous material during an injection of non-Newtonian fluid that follows a power law model. Fluid flows into the neighboring tissue due to high cavity pressure where it is absorbed by capillaries and lymphatics at a rate proportional to the local pressure. Power law fluid pressure and displacement of solid in the tissue are computed as function of radial distance and time. Numerical solutions indicate that shear thickening fluids exhibit less fluid pressure and induce small solid deformation as compared to shear thinning fluids. The absorption in the biological tissue increases as a consequence of flow induced deformation for power law fluids. In most cases non-Newtonian results are compared with viscous fluid case to magnify the differences.

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