Abstract Submitted
for the DFD06 Meeting of
The American Physical Society

Effects of the Transient Blood Flow-Wall Interaction on the Wall Stress Distribution in Abdominal Aortic Aneurysm (AAA) RUBING TANG, UCSD, CHRISTIAN GEINDREAU, 3S, UJF, INPG, CNRS, Grenoble, France, JUAN LASHERAS, UCSD — Our static finite element analysis (FEA) of both idealized and real clinical models has shown that the maximum diameter and asymmetry have substantial influence on the AAA wall stress distribution. The thrombus inside the AAA was also found to reduce the magnitude of the wall stresses. To achieve a better understanding of the wall stress distribution in real AAAs, a dynamic FEA was also performed. We considered models, both symmetric and non-symmetric, in which the aorta is assumed isotropic with nonlinear material properties. For the limiting case of rigid walls, the evolution of the flow pattern and the wall shear stresses due to fluid flow at different stages of cardiac cycle predicted by our simulations are compared with experimental results obtained in in-vitro models. A good agreement is found between both results. Finally, we have extended the analysis to the physiologically correct case of deformable walls and characterized the transient effects on the wall stresses.

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Date submitted: 06 Aug 2006 Electronic form version 1.4