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Effect of membrane constitutive equation on the recovery of capsules from large deformations ANDRES GONZALEZ-MANCERA, CHARLES EGGLETON, Dept. of Mechanical Engineering, UMBC — The recovery of capsules after large deformations can be used to calculate its material properties. We focus our attention on the influence of varying the membrane constitutive model and the initial geometry of the capsule on the recovery process. An axisymmetric computational model based on the boundary element method (BEM) is used to simulate the recovery of capsules from small and large deformations. Comparison is made between capsules having: (1) constant cortical (surface) tension [CCT], (2) two-dimensional Hooke's law [H], (3) Mooney-Rivlin law [MR] and (4) Evans and Skalak [ES] membrane models. At small initial deformations similar behavior is observed for all models and appears independent of initial geometry. The recovery process is more sensitive to initial conditions for large deformations due to the non-linear behavior of the elastic membranes. The difference in the local strain distribution caused by variations in the initial geometry significantly affects the membrane stress field at large deformations, and thus the recovery process.

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