

Biophysical Journal, Volume 97

Supporting Material

Recoil After Severing Reveals Stress Fiber Contraction Mechanisms

Matthew R. Stachowiak and Ben O'Shaughnessy

SUPPORTING MATERIAL

Movie S1

Recoil of a severed stress fiber with Table 1 parameter values, as predicted by our model (numerical solution of Eq. 1). Sequential sarcomere collapse from the severed end results in a growing collapsed cap. In active (collapsed) sarcomeres the myosin regions are depicted orange (dark gray) and α -actinin regions are depicted green (light gray). Focal adhesion shown black.

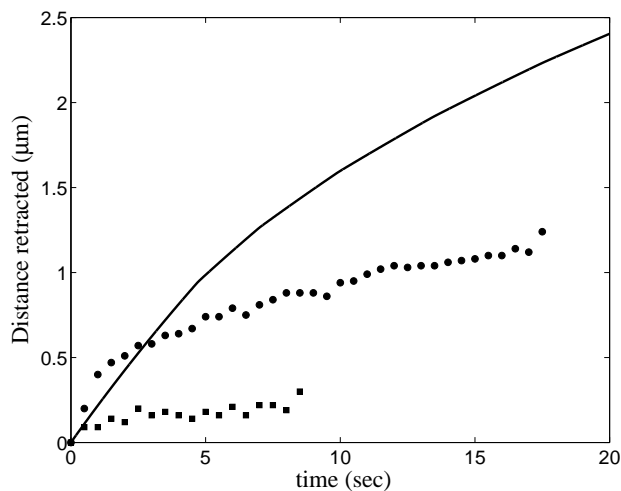


Figure S1: Effect of inhibition of myosin phosphorylation on SF recoil. Circles: ROCK inhibition, from Kumar et al. (9). Squares: MLCK inhibition, from Kumar et al. (9). Solid line: Model prediction with myosin stall force $f_s = 0$. Numerical solution of Eq. 1, all other parameters from Table 1.

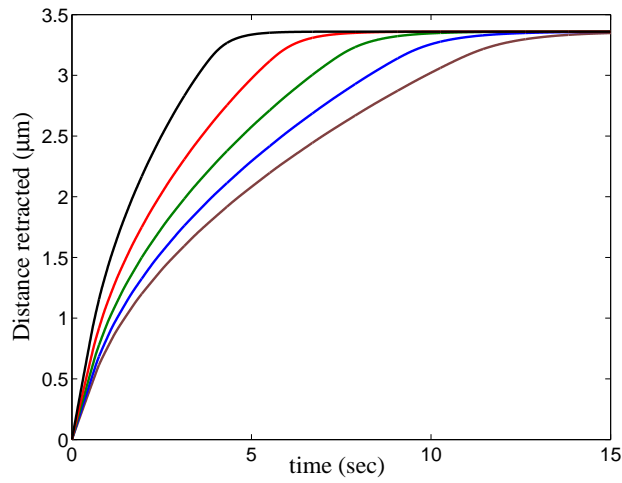


Figure S2: Predicted recoil of severed SFs with initial sarcomere lengths $x_{\text{sarc}}^0 = 0.6 \mu\text{m}$ (*black*), $0.9 \mu\text{m}$ (*red*), $1.2 \mu\text{m}$ (*green*), $1.5 \mu\text{m}$ (*blue*) and $1.8 \mu\text{m}$ (*brown*). The external drag coefficient was assumed proportional to sarcomere length ($\nu_{\text{ext}} \sim x_{\text{sarc}}^0$), with $\nu_{\text{ext}} = 5.3 \text{ pN}\cdot\text{s}/\mu\text{m}$ when $x_{\text{sarc}}^0 = 0.9 \mu\text{m}$. All other parameters from Table 1. Numerical solutions of Eq. 1.