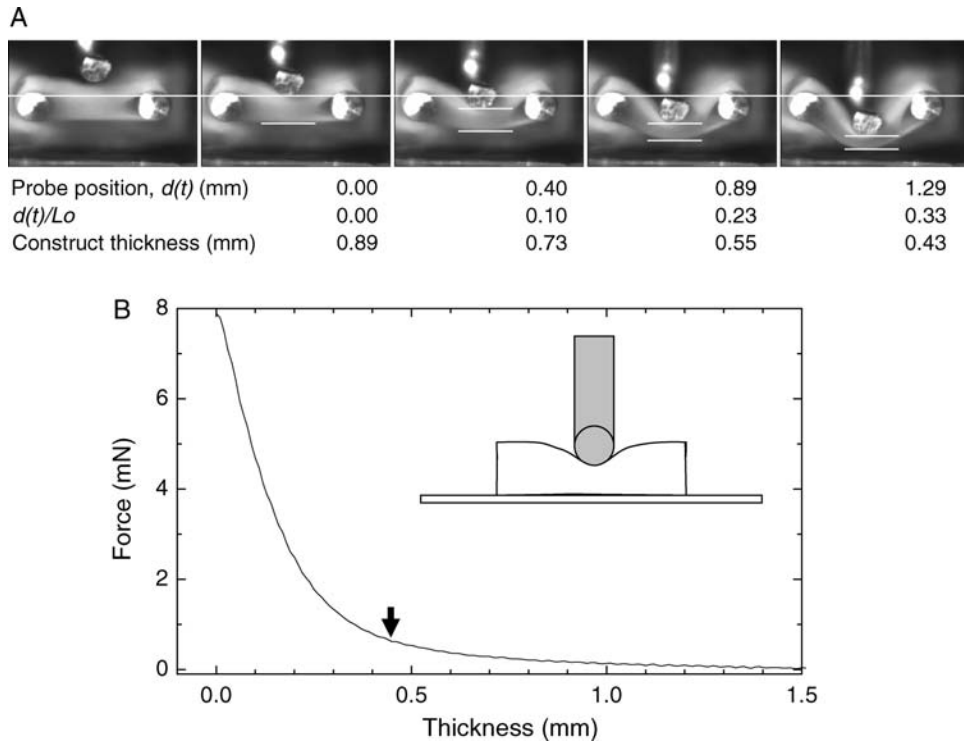
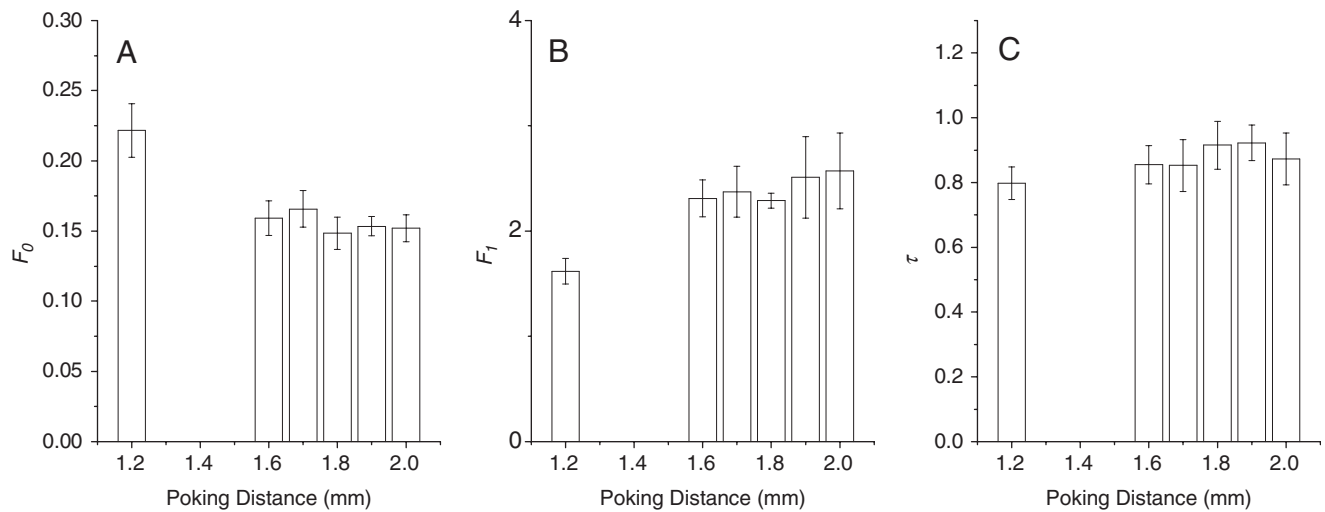


**SUPPLEMENTAL FIG. S1.** Comparison of CD treatment on different batches of HTCs. Dose-dependent curves of CD treatment of HTCs prepared on different dates were comparable. Each data point shows the average value for two to three replicate HTCs (error bars show Standard Error of the Mean (SEM)). The HTCs were prepared on 03/27/08 and 05/30/08 using different dishes of REF-52 cells. Consistent reproduction of CD dosage effect was observed in numerous other experiments (results not shown).



**SUPPLEMENTAL FIG. S2.** Compressive force measurement. Indentation of an HTC was recorded through a glass window attached to a tissue chamber. HTC thickness reduced from a nonstretch thickness of 0.89 mm to 0.43 mm at the near maximum stretch (**A**). An HTC was removed from the scaffolding bars and placed on the bottom of a tissue chamber. Compressive force increased exponentially as the HTC was compressed (**B**). However, it was not significant unless the HTC was compressed more than the maximal compression that was reached during normal stretching (arrow in **B**).



**SUPPLEMENTAL FIG. S3.** Parameter estimation with different indentation (poking) distances. The HTC were indented using different distances of probe movement. Tissue parameters  $F_0$ ,  $F_1$ , and  $\tau$  were estimated using distances ranging from 1.2 to 2 mm (1.4 mm not tested). On the average, the probe moved 0.37 mm before it touched the tissues (averaged  $\tau$  of 0.9 s at 0.5 mm/s probe speed minus the systematic delay of 0.08 mm in  $\tau$  estimation; see caption for Supplemental Movie S1). Comparable tissue mechanical parameters (A)  $F_0$  (mN), (B)  $F_1$  (mN), and (C)  $\tau$  (s) were obtained for poking distances from 1.6 to 2 mm. These indentation distances correspond to 14% to 20% tissue strain, respectively.

**SUPPLEMENTAL MOVIE S1.** Video of probe movement and ET indentation. The movie shows a representative REF-52 tissue being indented by the probe that is set at a 2 mm distance, that is, total distance of probe movement before it retracted. As compared to the time when the probe visibly touches the tissue, the  $\tau$  estimated from data fitting is systematically delayed by  $0.16 \pm 0.12$  s. This time delay corresponds to  $0.08 \pm 0.06$  mm of probe movement. Data obtained from eight individual indentations.