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Supplementary Information for

Internal fluid pressure influences muscle contractile force

David A. Sleboda and Thomas J. Roberts

David A. Sleboda
Email: david_sleboda@brown.edu

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Figure S1
Legends for Movies S1 to S2
Legend for Dataset S1

Other supplementary materials for this manuscript include the following:

Movies S1 to S2
Dataset S1

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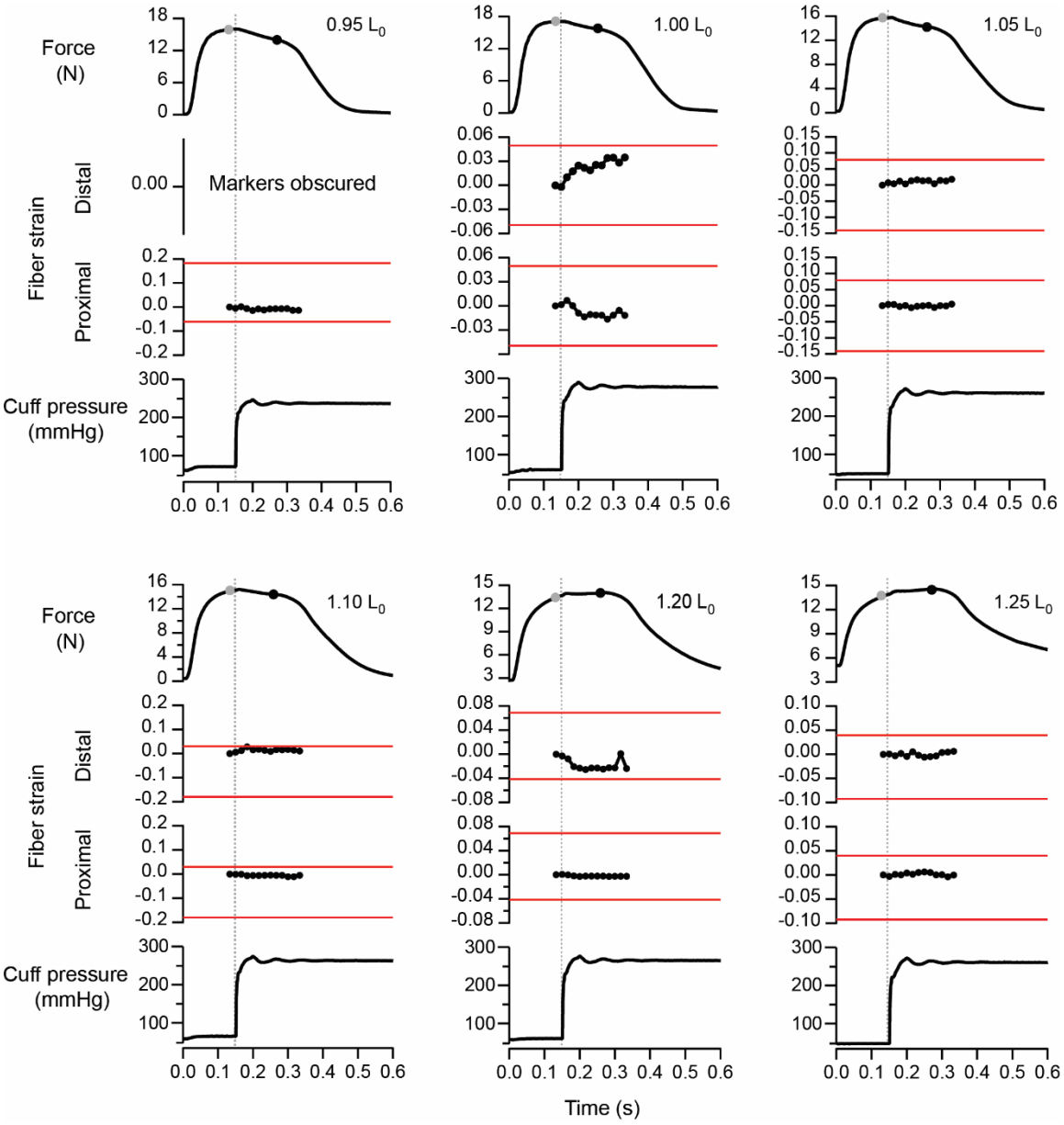

Fig. S1. Strain in distal and proximal superficial muscle fibers during cuff pressurization, determined via high-speed video tracking of suture markers (markers visible in main text figure 1 and supplemental movie S1). A 260 mmHg squeeze is applied mid-contraction (dotted vertical line) at various muscle lengths relative to L_0. Zero strain corresponds with the length of distal and proximal sections of muscle fibers immediately prior to cuff inflation. Red horizontal lines indicate positive and negative muscle strains that would be required to account for force changes via length-tension properties alone.

Movie S1 (separate file). High speed video showing an isolated semimembranosus muscle squeezed mid-contraction at 1.15 L_0. Contraction is initiated at the start of the video. Once an isometric force plateau is reached, a squeeze is applied via inflation of a pneumatic pressure cuff fit about the muscle belly. The muscle relaxes after a period of squeeze. Text animations denote the onset of contraction, squeezing, and relaxation.

Movie S2 (separate file). Video showing the responses of two physical models of muscle morphology to squeeze. A model with helical fibers oriented at roughly 25° relative to the model long axis shortens and lifts a 200 g mass when squeezed via a pair of pneumatic pressure cuffs. A model with fibers oriented at roughly 75° lengthens in response to the same perturbation. Text animations indicate periods of squeezing. During these periods, cuffs were manually inflated with air via an in-series syringe.

Dataset S1 (separate file). Tabulated forces measured from passive and active muscles immediately before (pre-squeeze) and after (post-squeeze) pressurization via a pneumatic cuff. Values are normalized to maximum isometric force (P_0) and optimum muscle length (L_0) as determined from initial length-tension curves collected prior to squeezing perturbations. P_0 and L_0 are reported for each muscle in newtons (N) and millimeters (mm), respectively.