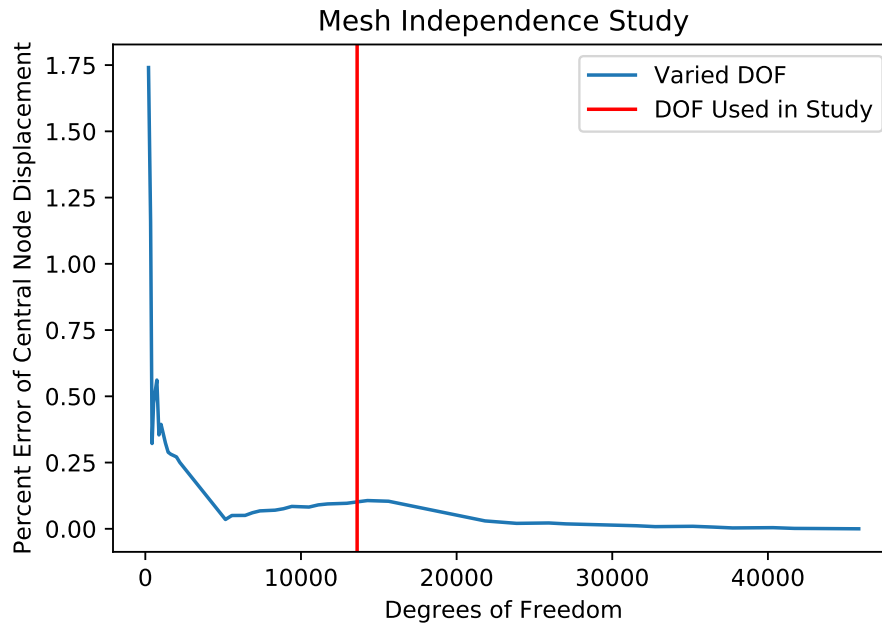


Appendices



Supplementary Figure 1: An arbitrary bending deformation was simulated using meshes with varying degrees of freedom. The finest mesh (45835 degrees of freedom) was completed first and the maximum deflection of the center of the bending face was recorded (y_f). This value was used to compute the percent error of the maximum central node deflection among the other meshes (y_n) undergoing the same bending deformation and is computed as $\%error = \frac{y_n - y_f}{y_f} * 100$. There is less than 0.05 % error between the mesh size used in this study (13608 degrees of freedom) and a highly-refined and computationally expensive mesh (45835 degrees of freedom). We conclude that the mesh size used for this study is sufficiently refined.

Table 1: Stiffness Modulated Gel Formulations.

Hydrogel Composition	2.5 kPa	5 kPa	10 kPa
40 kDa, 8 arm PEG-Nb	3 wt%	5 wt%	5 wt%
CRGDS	1 mM	1 mM	1 mM
MMP	0.97 mM	3.25 mM	4.5 mM
LAP	0.05 wt%	0.05 wt%	0.05 wt%
Thiole:Ene	0.49:1	0.75:1	1:1

Table 2: CRGDS Modulated Gel Formulations.

Hydrogel Composition	0 mM CRGDS	0.5 mM CRGDS	1.0 mM CRGDS
40 kDa, 8 arm PEG-Nb	5 wt%	5 wt%	5 wt%
CRGDS	0 mM	0.5 mM	1.0 mM
MMP	4.5 mM	4.5 mM	4.5 mM
LAP	0.05 wt%	0.05 wt%	0.05 wt%
Thiole:Ene	0.90:1	0.95:1	1:1

Table 3: Sample information for modulus varied test specimens.

Hydrogel Stiffness	Specimen Number	Specimen Thickness (mm)	Specimen Width (mm)	I (mm ⁴)	μ -Normal (kPa)	μ -Hypertensive (kPa)	μ -Non-contractile (kPa)	r ² (AVG)
2.5 kPa	1	1.18	5.72	0.78	0.79	0.85	0.70	0.97
	2	1.39	5.39	1.20	0.41	0.38	0.26	0.86
	3	1.86	5.48	2.94	0.22	0.29	0.12	0.91
	4	1.50	5.28	0.84	0.66	0.80	0.52	0.90
	5	1.24	5.20	1.16	0.33	0.50	0.25	0.98
	Mean	1.43	5.41	1.38	0.48	0.56	0.37	0.92
	SEM	0.12	0.09	0.40	0.11	0.11	0.11	0.03
5 kPa	1 ¹	1.60	6.20	2.12	1.40	3.96	0.67	0.96
	2	1.73	5.95	2.55	1.93	2.25	1.84	0.95
	3	1.82	6.31	3.17	1.59	2.04	1.20	0.825
	4	1.41	6.04	1.41	1.38	1.59	1.04	0.99
	5	1.05	5.80	1.35	1.80	1.95	1.54	0.92
	Mean	1.52	6.06	2.12	1.62	2.36	1.26	0.93
	SEM	0.14	0.09	0.35	0.11	0.46	0.20	0.03
10 kPa	1	1.33	5.89	1.15	1.73	2.02	1.69	0.98
	2	1.43	5.38	1.31	1.95	2.06	1.82	0.98
	3	1.80	6.50	3.16	2.27	2.66	1.74	0.87
	4	1.28	5.95	1.04	2.60	2.97	1.84	0.96
	5	1.32	5.61	1.07	1.31	1.35	1.31	0.98
	Mean	1.43	5.87	1.55	1.97	2.21	1.68	0.95
	SEM	0.10	0.19	0.41	0.22	0.28	0.10	0.02

¹Outlier and not included in analysis

Table 4: Sample information for RGDS concentration modulated test specimens.

RGDS Conc.	Specimen Number	Specimen Thickness (mm)	Specimen Width (mm)	I (mm ⁴)	μ -Normal (kPa)	μ -Hypertensive (kPa)	μ -Non-contractile (kPa)	r ² (AVG)
0 mM	1	1.10	5.50	0.61	1.98	1.73	2.00	0.95
	2	1.24	5.96	0.95	1.74	2.15	1.76	0.81
	3	1.53	5.44	1.62	0.90	0.96	1.03	0.94
	4	1.26	5.46	0.92	1.22	1.03	1.08	0.89
	5	1.43	5.85	1.44	1.58	1.41	1.49	0.95
	Mean	1.31	5.64	1.11	1.36	1.39	1.47	0.90
	SEM	0.08	0.11	0.18	0.17	0.24	0.19	0.03
0.5 mM	1	1.31	5.45	1.02	2.84	2.79	2.25	0.99
	2	1.29	5.70	1.02	0.95	1.34	1.17	0.95
	3	1.32	5.98	1.15	1.45	1.90	1.25	0.98
	4	1.28	5.28	0.92	1.94	1.88	1.21	0.93
	5	1.30	5.65	1.03	2.53	2.90	2.48	0.89
	Mean	1.30	5.612	1.03	1.94	2.16	1.67	0.95
	SEM	0.007	0.12	0.04	0.35	0.30	0.28	0.02
1.0 mM	1	1.33	5.89	1.15	1.73	2.02	1.69	0.98
	2	1.43	5.38	1.31	1.95	2.06	1.82	0.98
	3	1.80	6.50	3.16	2.27	2.66	1.74	0.87
	4	1.28	5.95	1.04	2.60	2.97	1.84	0.96
	5	1.32	5.61	1.07	1.31	1.35	1.31	0.98
	Mean	1.43	5.87	1.55	1.97	2.21	1.68	0.95
	SEM	0.10	0.19	0.41	0.22	0.28	0.10	0.02