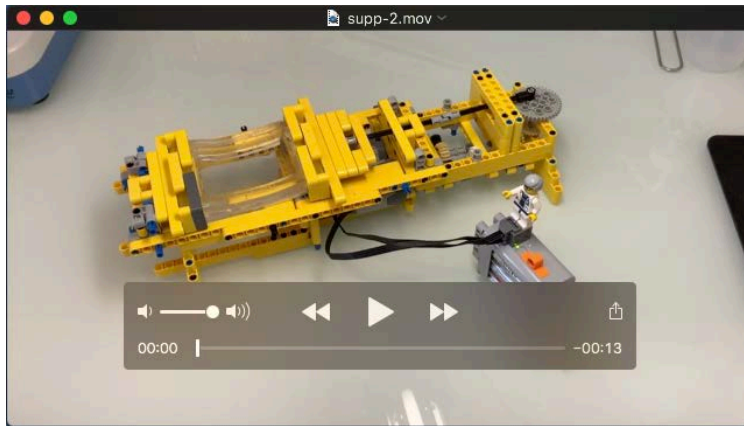


Supplementary information



Movie 1 – Movie presenting the system in action with an empty PDMS plate.



Movie 2 – Movie presenting the system in action with an empty PDMS plate in context in a tissue culture incubator.



Movie 3 – Movie used to characterize the wave form and features of the mechanical stimulation.

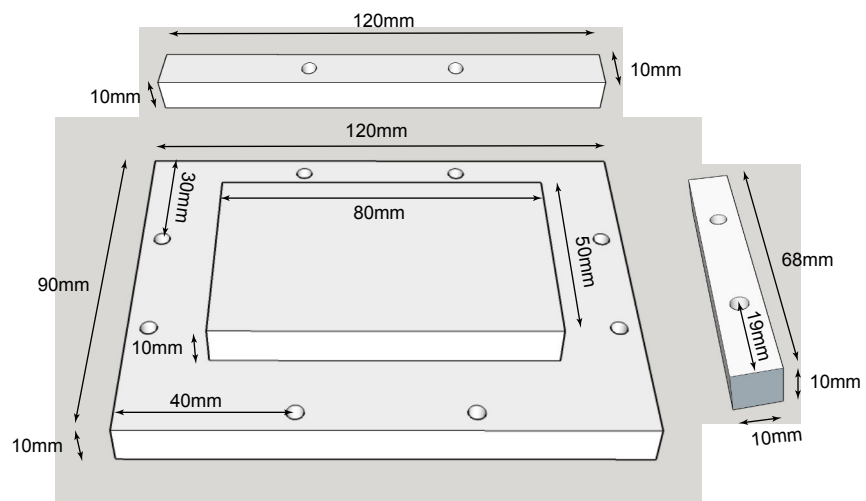


Figure S1 – Parts constituting the PDMS casting mold

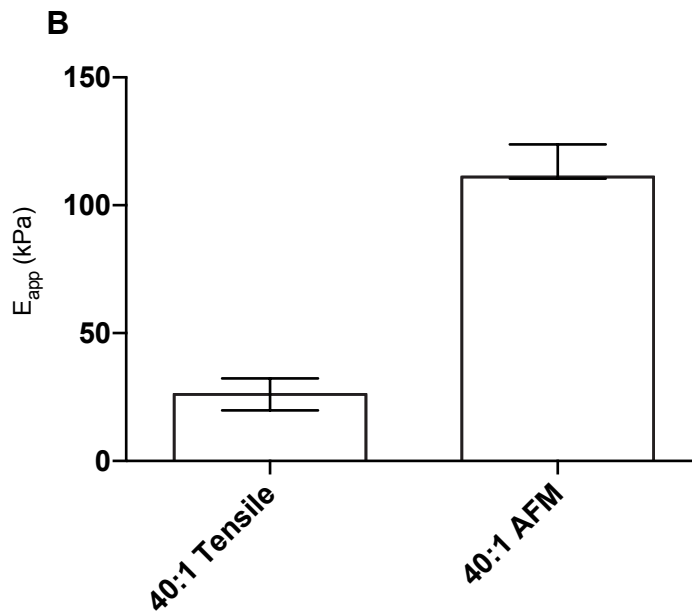
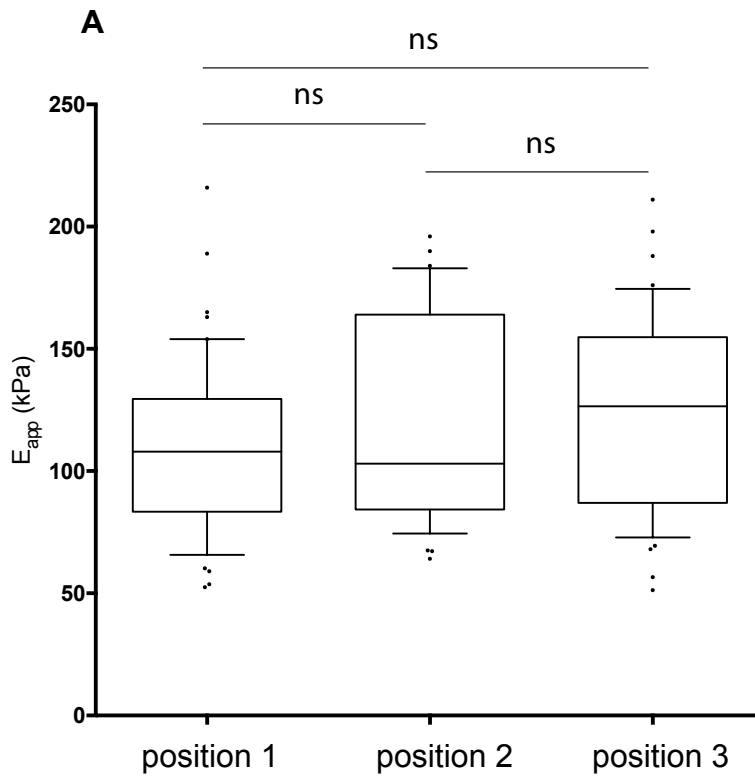


Figure S2 – Mechanical characterization of the PDMS surface

A box and whisker plot showing the elastic modulus of 40:1 PDMS surface measured by AFM at three different random positions. Statistical significance was assessed in a one-way ANOVA Kruskal-Wallis test with respectively $n=49$, 39 and 44 points. B Histogram plot showing the elastic modulus of 40:1 PDMS surfaces as measured by AFM and tensile test respectively. For AFM measurement, three different random positions were measured with $n=132$ points total. For AFM, mean is plotted with s.e.m. as error bars. For tensile test, curve fitting result is indicated with curve fitting 95% C.I. as error bars. Statistical significance could not be assessed because tensile measurements were obtained from a curve fitting of a stress/strain curve generated by tensile measurements.

Table S1 – List of individual LEGO® parts required to assemble the mechanical stretcher.

LEGO® part	PartName	Qty
18575	Technic Gear 20 Tooth Double Bevel Reinforced	1
2780	Technic, Pin with Friction Ridges Lengthwise WITH Center Slots	1
2780	Technic, Pin with Friction Ridges Lengthwise WITH Center Slots	4
2780	Technic, Pin with Friction Ridges Lengthwise WITH Center Slots	88
32013	Technic, Axle and Pin Connector Angled #1	1
32198	Technic, Gear 20 Tooth Bevel	1
32198	Technic, Gear 20 Tooth Bevel	1
32270	Technic, Gear 12 Tooth Double Bevel	2
32278	Technic, Liftarm 1 x 15 Thick	20
32316	Technic, Liftarm 1 x 5 Thick	3
32523	Technic, Liftarm 1 x 3 Thick	16
32524	Technic, Liftarm 1 x 7 Thick	13
32525	Technic, Liftarm 1 x 11 Thick	7
32526	Technic, Liftarm 3 x 5 L-Shape Thick	1
32526	Technic, Liftarm 3 x 5 L-Shape Thick	8
32556	Technic, Pin 3L without Friction Ridges Lengthwise	2
3647	Technic, Gear 8 Tooth Type 1	1
3647	Technic, Gear 8 Tooth Type 1	4
x187	Technic, Gear 24 Tooth (Old Style with Three Axle Holes)	1
3649	Technic, Gear 40 Tooth	1
3673	Technic, Pin without Friction Ridges Lengthwise	1
3673	Technic, Pin without Friction Ridges Lengthwise	2
3706	Technic, Axle 6	1
3706	Technic, Axle 6	1
3707	Technic, Axle 8	1
3713	Technic Bush	2
3713	Technic Bush	2
3737	Technic, Axle 10	2
40490	Technic, Liftarm 1 x 9 Thick	22
41239	Technic, Liftarm 1 x 13 Thick	6
44294	Technic, Axle 7	1
4459	Technic, Pin with Friction Ridges Lengthwise WITHOUT Center Slots	8
44809	Technic, Pin Connector Perpendicular 2 x 2 Bent	4
44809	Technic, Pin Connector Perpendicular 2 x 2 Bent	3
4519	Technic, Axle 3	1
55013	Technic, Axle 8 with Stop	1
55615	Technic, Pin Connector Perpendicular 3 x 3 Bent with 4 Pins	4
58121c01	Electric, Motor 9V Power Functions XL with Dark Bluish Gray Bottom	2
62520	Technic, Universal Joint 3L, End	2
6558	Technic, Pin 3L with Friction Ridges Lengthwise	4
6558	Technic, Pin 3L with Friction Ridges Lengthwise	66
6558	Technic, Pin 3L with Friction Ridges Lengthwise	5
75535	Technic, Pin Connector Round 2L without Slot (Pin Joiner Round)	1
60c01	Technic, Gear 24 Tooth Clutch	1
87082	Technic, Pin 3L with Friction Ridges Lengthwise and Center Pin Hole	6
87083	Technic, Axle 4 with Stop	1
87083	Technic, Axle 4 with Stop	1

Total qty
325