

Title: Investigating Mechanisms of Tendon Damage by Measuring Multi-scale Recovery Following Tensile Loading

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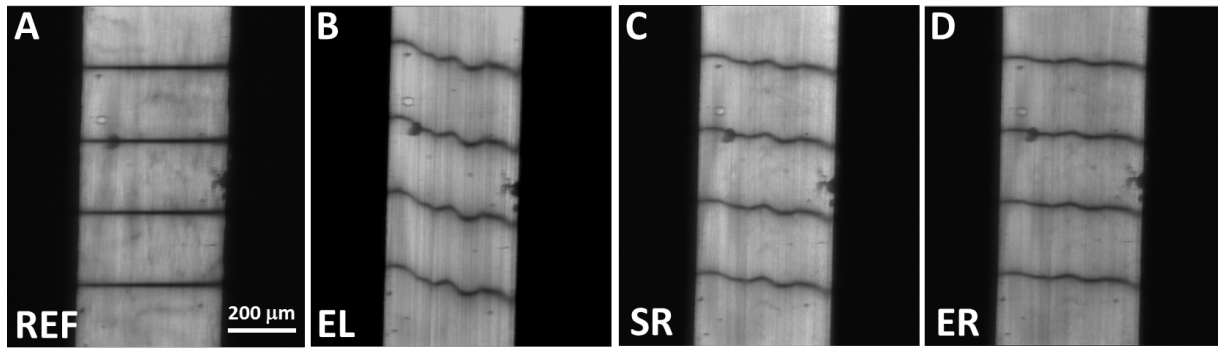
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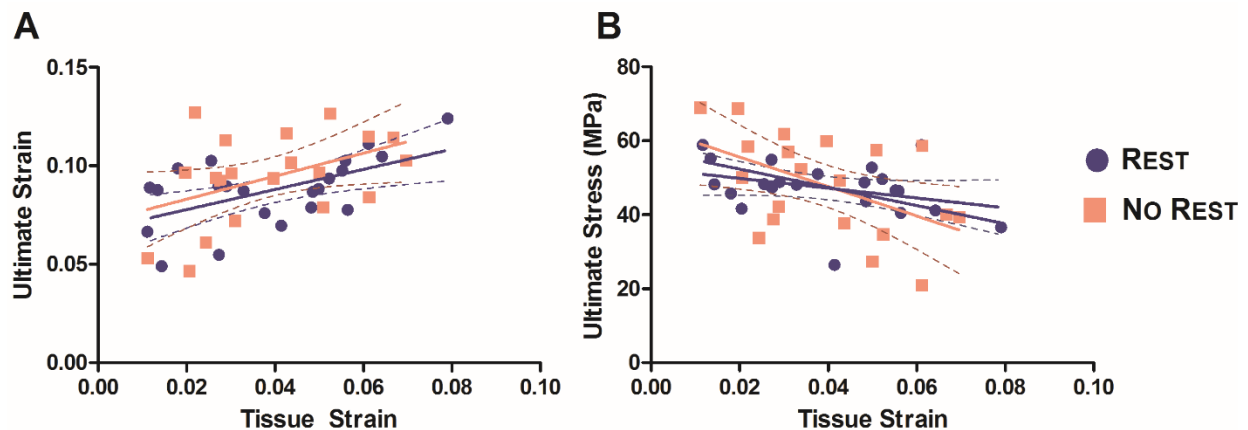
Keyword

Tendon, Damage, Recovery, Fibril Sliding, Multi-scale testing



Supplementary Material 1. Representative image of tendon used to measure micro-scale with four photobleached lines. (A) The image corresponds to reference state, before loading. (B) At EL (end of loading), the fibril strain (ϵ) and interfibrillar sliding (γ) increased compared to the REF image. (C) The interfibrillar sliding recovered when unloaded as seen in SR (start of rest). (D) However, the interfibrillar sliding was only partially recoverable, as shown at ER (end of rest).

Supplementary Material 2. (1) Ultimate strain increased with applied tissue strain as expected for both groups, and (2) ultimate stress decreased with tissue strain only for No Rest group. However, there was no difference between the slopes of NO REST and REST groups. The dashed lines represent the 95% confidence intervals.

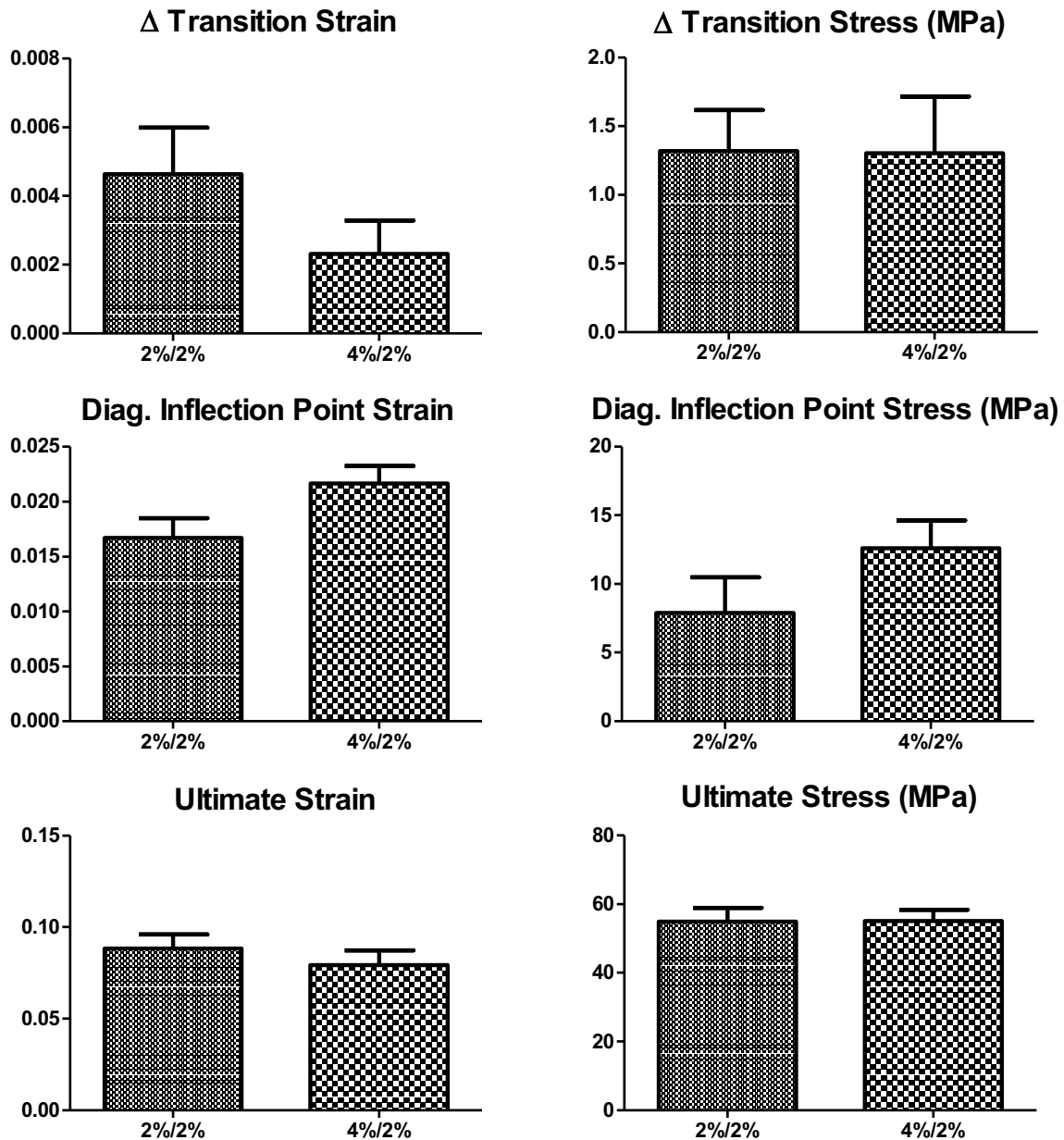


Supplementary Material 3. Table includes BASELINE and DIAGNOSTIC values for inflection point in grip strain (average \pm SD).

		Grip Strain			
		Inflection Point Strain		Inflection Point Stress (MPa)	
		<i>BASELINE</i>	<i>DIAGNOSTIC</i>	<i>BASELINE</i>	<i>DIAGNOSTIC</i>
2%	NO REST		0.031 \pm 0.003		12.7 \pm 3.31
	REST		0.031 \pm 0.002		12.9 \pm 1.30
4%	NO REST		0.041 \pm 0.001		15.3 \pm 4.27
	REST		0.041 \pm 0.002		17.3 \pm 3.42
6%	NO REST	0.032 \pm 0.002	0.060 \pm 0.003	14.3 \pm 2.36	24.3 \pm 4.86
	REST	0.034 \pm 0.004	0.057 \pm 0.005	13.1 \pm 3.33	22.1 \pm 5.85
8%	NO REST	0.036 \pm 0.002	0.074 \pm 0.003	12.4 \pm 2.04	21.5 \pm 5.82
	REST	0.036 \pm 0.004	0.066 \pm 0.006	14.1 \pm 2.28	23.6 \pm 2.76

Supplementary Material 4. Table includes percentage decrease in fibril strain and increase in interfibrillar sliding during the 15 minute loading period.

Strain Group (%)	Interfibrillar Sliding (%)	Fibril Strain (%)
2	13.5 \pm 20.6	-7.9 \pm 47.2
4	19.2 \pm 9.9	13.6 \pm 18.9
6	11.1 \pm 9.3	15.6 \pm 10.3
8	15.3 \pm 16.5	22.5 \pm 13.7



Supplementary Material 5. Both groups were loaded to 2% during BASELINE, but preconditioned at difference levels. 2% represents samples (n=4) preconditioned at 2% and 4% represents samples (n=14) preconditioned at 4%. There was no difference between two groups in all of the fascicle-level parameters ($p > 0.10$). The error bars represents SEM.