Table S1. Characteristics of the 16 cyclists tested.

Subject	Sex	Age (y)	Height (cm)	Body Mass (kg)	LG Max Isometric Force (N)*	MG Max Isometric Force (N)*	LG tendon Stiffness (N mm^{-1})†	MG tendon Stiffness (N mm^{-1})†
1	M	29	186	90.85	674	1179	34.5	63.2
2	M	28	167	68.00	588	1028	22.0	38.9
3	M	33	175	68.00	546	956	36.2	50.0
4	M	32	183	63.00	488	854	22.5	39.0
5	M	37	173	71.80	599	1047	39.2	55.0
6	M	30	179	70.30	555	972	24.5	41.8
7	M	47	183	86.50	661	1157	42.7	59.1
8	M	31	183	82.80	676	1184	26.3	41.2
9	F	30	167	65.80	584	1022	34.5	73.6
10	F	43	174	64.40	552	966	28.9	55.4
11	F	24	171	65.80	571	999	27.8	52.0
12	F	26	167	58.00	500	874	22.1	47.2
13	F	22	160	51.30	474	830	25.3	43.4
14	F	23	168	68.00	608	1065	29.5	58.8
15	F	20	165	67.30	622	1089	26.9	42.4
16	F	32	167	59.40	541	948	38.2	59.2

* Estimates of the muscles' maximum isometric force-generating capacity based on the muscles' volumes (Handsfield et al., 2014) and optimal fibre lengths (Arnold et al., 2010), assuming a maximum isometric muscle stress σ_0 of 225 kPa. (Spector et al., 1980; Roy et al., 1982).

†Linear region LG and MG AT stiffnesses were estimated as the proportion of the total AT stiffness contributed by each muscle based on ratio of the maximum force-generating capacity $F_{\max}$ of either the LG or MG to the combined triceps surae maximum force.

Table S2. Chi-square test results for comparison of r^2 and RMSE between one-element and two-element Hill-type muscle models.

		Coefficient of determination, r^2		RMSE	
Cadence (r.p.m.)	**Load (N m)**	**two-element (% total)**	***p*-value**	**two-element (% total)**	***p*-value**
60	44	46.9	0.73	37.5	0.15
80	14	59.4	0.29	28.1	0.01
80	26	62.5	0.16	43.8	0.47
80	35	65.6	0.07	43.8	0.47
80	44	59.4	0.29	46.9	0.72
100	26	71.9	**0.01***	62.5	0.15
120	13	68.8	**0.03***	68.8	**0.03***
140	13	71.9	**0.01***	68.8	**0.03***

Values in % total column indicate the number of times for the combined MG and LG results across individual subjects and pedalling conditions, as a %, that the two-element model performed better (higher r^2 and lower RMSE) (n=16). Differences were considered significant at the p<0.05 level.
*indicates p<0.05

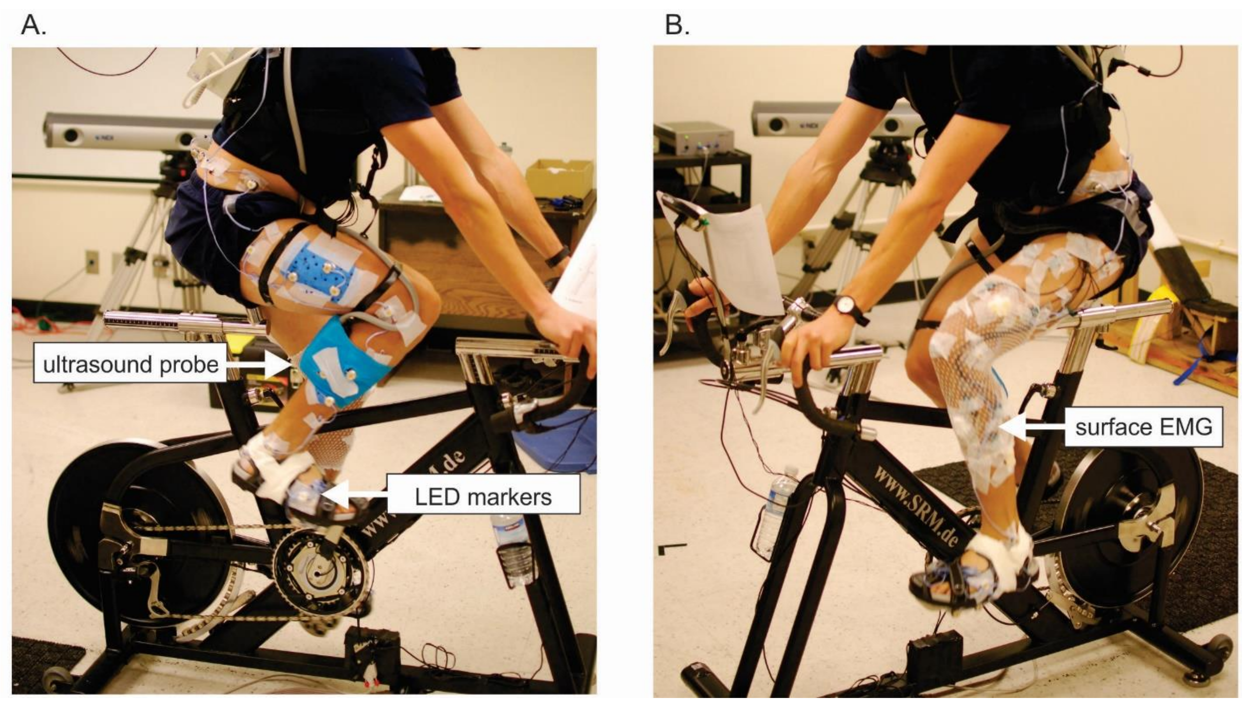

Fig. S1. Experimental set up displaying B-mode ultrasound probe positioned over the LG muscle belly to image muscle fascicles and LED motion capture markers to record kinematics (A) and surface EMG electrodes placed on contralateral limb to record simultaneous muscle excitations (B).

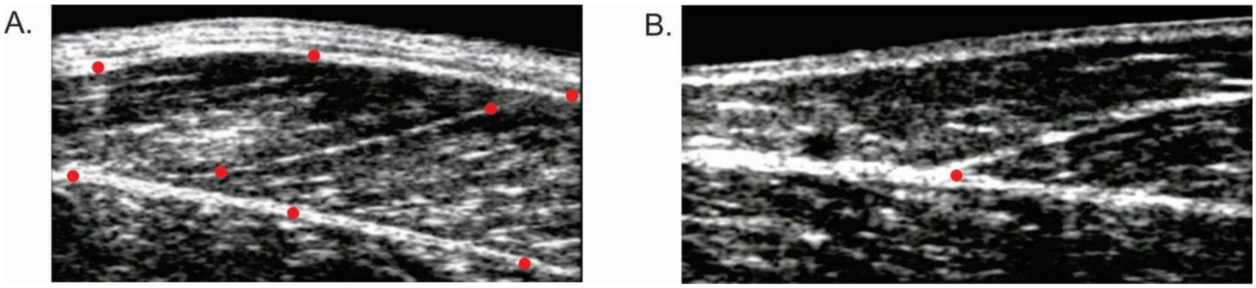

Fig. S2. B-mode ultrasound images of the MG muscle belly (A) and MG muscle-tendon junction (B). Red dots indicate digitized points that were used to determine time-varying fascicle lengths and pennation angles from (A) and tendon lengths from (B).

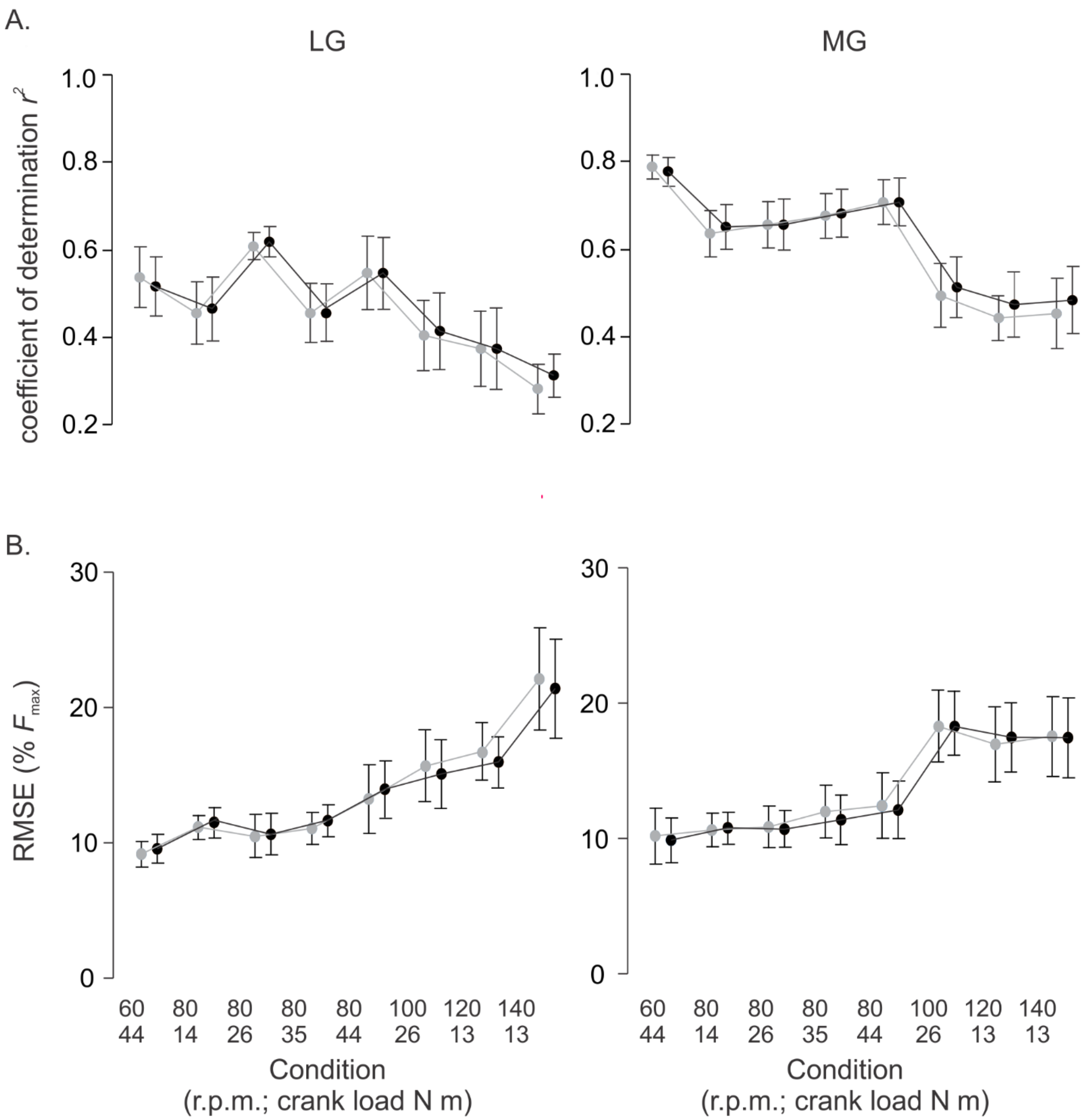

Fig. S3. Model predictions differ between muscles, pedalling conditions, and model type. Comparison of the one-element (grey) and two-element (black) Hill-type models using r^2 (A) and RMSE (B) across the pedal cycle for the LG and MG. Data points shown represent the mean ± SE across all subjects at each pedalling condition.