

Supplementary Materials:

PPCA estimated joint moments (Figure S1): The customized PPCA KOA-based model showed an average RMSE of the estimated hip flexion, adduction and rotation moment of 0.15 ± 0.04 Nm/kg, 0.16 ± 0.04 Nm/kg and 0.03 ± 0.06 Nm/kg, respectively with R^2 of 0.77 ± 0.20 , 0.79 ± 0.15 and 0.59 ± 0.24 , respectively. And the average RMSE of the estimated knee flexion and ankle flexion moment of 0.12 ± 0.06 Nm/kg and 0.15 ± 0.04 Nm/kg, respectively with R^2 of 0.69 ± 0.15 and 0.92 ± 0.35 , respectively.

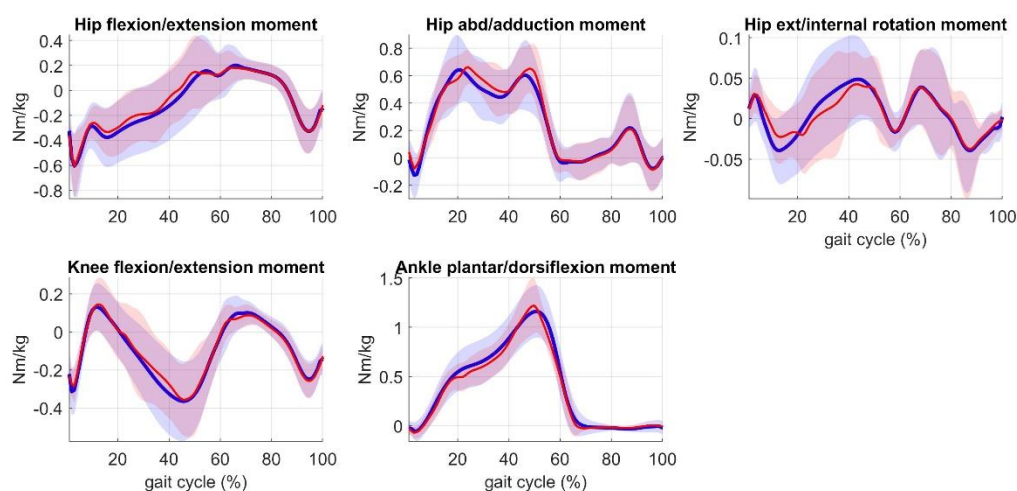


Figure S1. MoCap (blue) vs estimated (red) joint moments of the PPCA KOA population-based model.

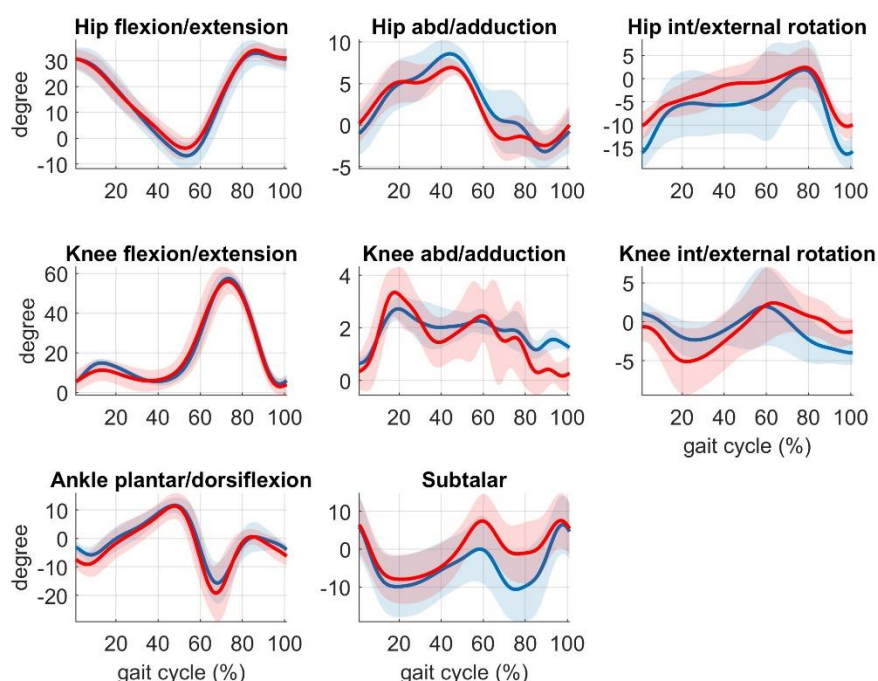


Figure S2. MoCap (blue) vs InCap (red) joint kinematics comparison

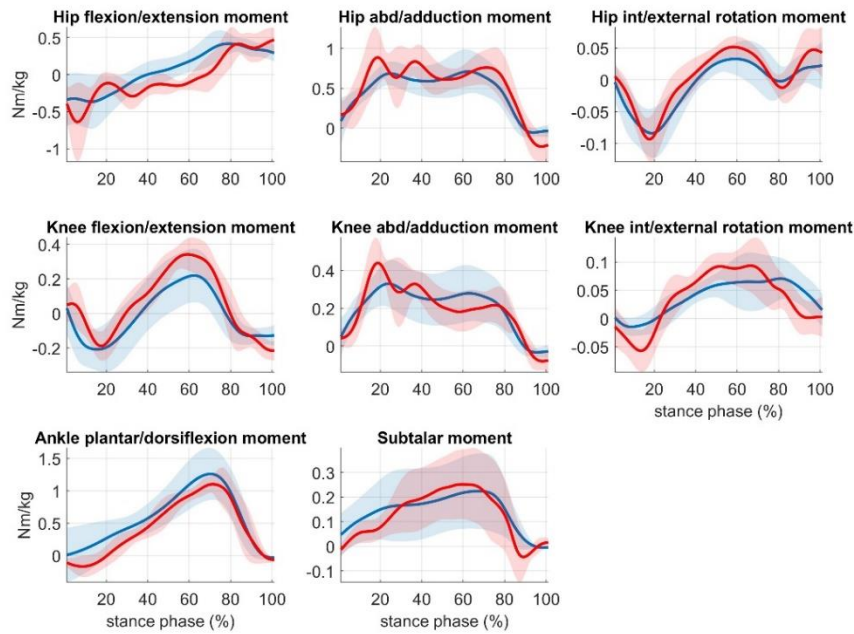


Figure S3. MoCap (blue) vs InCap (red) joint moments comparison

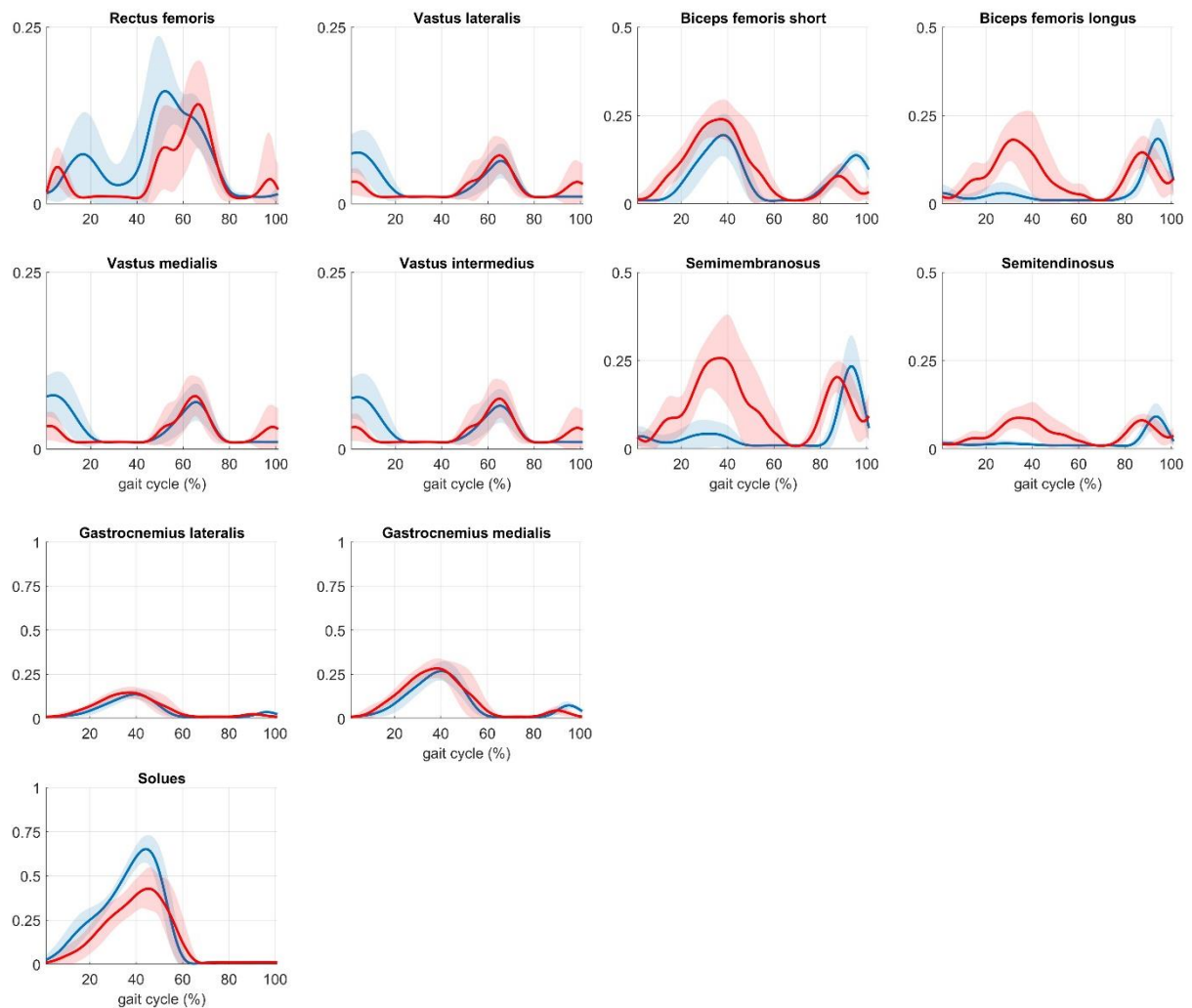


Figure S4. MoCap (blue) vs InCap (red) muscle activation comparison (main muscles).

Table S1. Root mean square error (RMSE) and coefficient of determination (R2) of joint kinematics, joint moments and muscle activation between MoCap and InCap.

Joint kinematics	RMSE (°)		R2	
	Mean	Std	Mean	Std
Hip flexion/extension	5.04	1.70	0.95	0.05
Hip abd/adduction	1.88	0.56	0.86	0.10
Hip int/external rotation	4.73	2.50	0.83	0.21
Knee flexion/extension	4.78	1.52	0.92	0.09
Knee abd/adduction	1.42	0.31	0.45	0.17
Knee int/external rotation	4.44	1.86	0.47	0.20
Ankle plantar/dorsiflexion	5.12	1.25	0.84	0.17
Subtalar	4.80	1.36	0.70	0.13

Joint moments	RMSE (Nm/kg)		R2	
	Mean	Std	Mean	Std
Hip flexion/extension	0.31	0.20	0.57	0.12
Hip abd/adduction	0.31	0.14	0.69	0.20
Hip int/external rotation	0.03	0.01	0.73	0.12
Knee flexion/extension	0.14	0.07	0.74	0.19
Knee abd/adduction	0.14	0.04	0.69	0.18
Knee int/external rotation	0.04	0.02	0.65	0.26
Ankle plantar/dorsiflexion	0.32	0.19	0.75	0.17
Subtalar	0.16	0.08	0.52	0.31

Muscle activation	RMSE (0-1)		R2	
	Mean	Std	Mean	Std
Gastrocnemius lateralis	0.033	0.020	0.81	0.18
Gastrocnemius medialis	0.065	0.038	0.80	0.20
Soleus	0.130	0.041	0.73	0.18
Biceps femoris short	0.076	0.039	0.48	0.30
Biceps femoris long	0.095	0.037	0.12	0.14
Semimembranosus	0.141	0.054	0.12	0.11
Semitendinosus	0.048	0.016	0.10	0.12
Vastus lateralis	0.026	0.015	0.44	0.34
Vastus medialis	0.024	0.014	0.45	0.34
Vastus intermedius	0.025	0.014	0.44	0.34
Rectus femoris	0.064	0.029	0.33	0.25

Table S2. p and q-value for testing significancy (< 0.05) of differences in Knee contact forces peak and impulse—significant different values in bold.

		MoCap vs InCap	
		p-value	q-value
Peak 1	Total	0.4623	1.6816
	Medial	0.1221	0.6218
	Lateral	0.1868	0.7925
Peak 2	Total	0.0143	0.1212
	Medial	0.0316	0.2009
	Lateral	0.5463	1.7388
Impulse	Total	0.0020	0.0252
	Medial	0.0010	0.0252
	Lateral	0.8799	2.4894