

Supplementary Information

Detailed statistics for subject-specific gait calibration

Table 1: Subject-specific correction-amplitude statistics across the six lower-limb joints.

Joint	n	Mean	SD	CV (%)	Common amplitude
RHip	42	0.900	0.460	51.10	0.835
LHip	42	0.936	0.489	52.20	0.829
RKnee	42	1.092	0.569	52.09	0.888
LKnee	42	1.141	0.674	59.08	0.960
RAnkle	42	1.028	0.385	37.43	0.940
LAnkle	42	0.869	0.403	46.37	0.739

Note. Mean and SD denote the mean and between-participant standard deviation of the subject-specific correction amplitude, respectively. CV is the coefficient of variation, calculated from the unrounded values as $CV = 100 \times SD / \text{Mean}$. The common amplitude denotes the population amplitude estimate obtained from the corresponding nested-LOSO training set.

Table 2: Exact per-joint paired Wilcoxon signed-rank tests on participant-level RMSE for the T04–T06 evaluation trials. Raw two-sided p -values were adjusted within each six-joint comparison family using the Holm step-down procedure.

Comparison	Joint	n	Raw p	Holm-adjusted p	Significant
Full vs. population	RHip	42	2.44×10^{-10}	1.22×10^{-9}	Yes
	LHip	42	4.00×10^{-11}	2.40×10^{-10}	Yes
	RKnee	42	7.68×10^{-3}	1.54×10^{-2}	Yes
	LKnee	42	8.65×10^{-3}	1.54×10^{-2}	Yes
	RAnkle	42	1.63×10^{-4}	6.50×10^{-4}	Yes
	LAnkle	42	1.32×10^{-3}	3.95×10^{-3}	Yes
Shape-only vs. population	RHip	42	1.63×10^{-7}	8.17×10^{-7}	Yes
	LHip	42	1.27×10^{-8}	7.61×10^{-8}	Yes
	RKnee	42	4.69×10^{-3}	9.39×10^{-3}	Yes
	LKnee	42	3.47×10^{-2}	3.47×10^{-2}	Yes
	RAnkle	42	7.83×10^{-5}	2.35×10^{-4}	Yes
	LAnkle	42	5.34×10^{-5}	2.14×10^{-4}	Yes
Amplitude-only vs. population	RHip	42	1.22×10^{-2}	3.74×10^{-2}	Yes
	LHip	42	3.47×10^{-10}	2.08×10^{-9}	Yes
	RKnee	42	2.53×10^{-1}	5.06×10^{-1}	No
	LKnee	42	6.92×10^{-1}	6.92×10^{-1}	No
	RAnkle	42	9.36×10^{-3}	3.74×10^{-2}	Yes
	LAnkle	42	5.56×10^{-4}	2.78×10^{-3}	Yes
Full vs. shape-only	RHip	42	2.56×10^{-5}	1.54×10^{-4}	Yes
	LHip	42	2.73×10^{-4}	1.37×10^{-3}	Yes
	RKnee	42	9.31×10^{-1}	1.00	No
	LKnee	42	4.75×10^{-2}	1.90×10^{-1}	No
	RAnkle	42	6.03×10^{-1}	1.00	No
	LAnkle	42	7.57×10^{-1}	1.00	No

Note. $n = 42$ denotes the number of participants. Participant-level RMSE was calculated as the mean RMSE across the three independent evaluation trials (T04–T06). The four comparison families were full versus population, shape-only versus population, amplitude-only versus population, and full versus shape-only. Holm correction was applied separately within each six-joint comparison family at $\alpha = 0.05$.