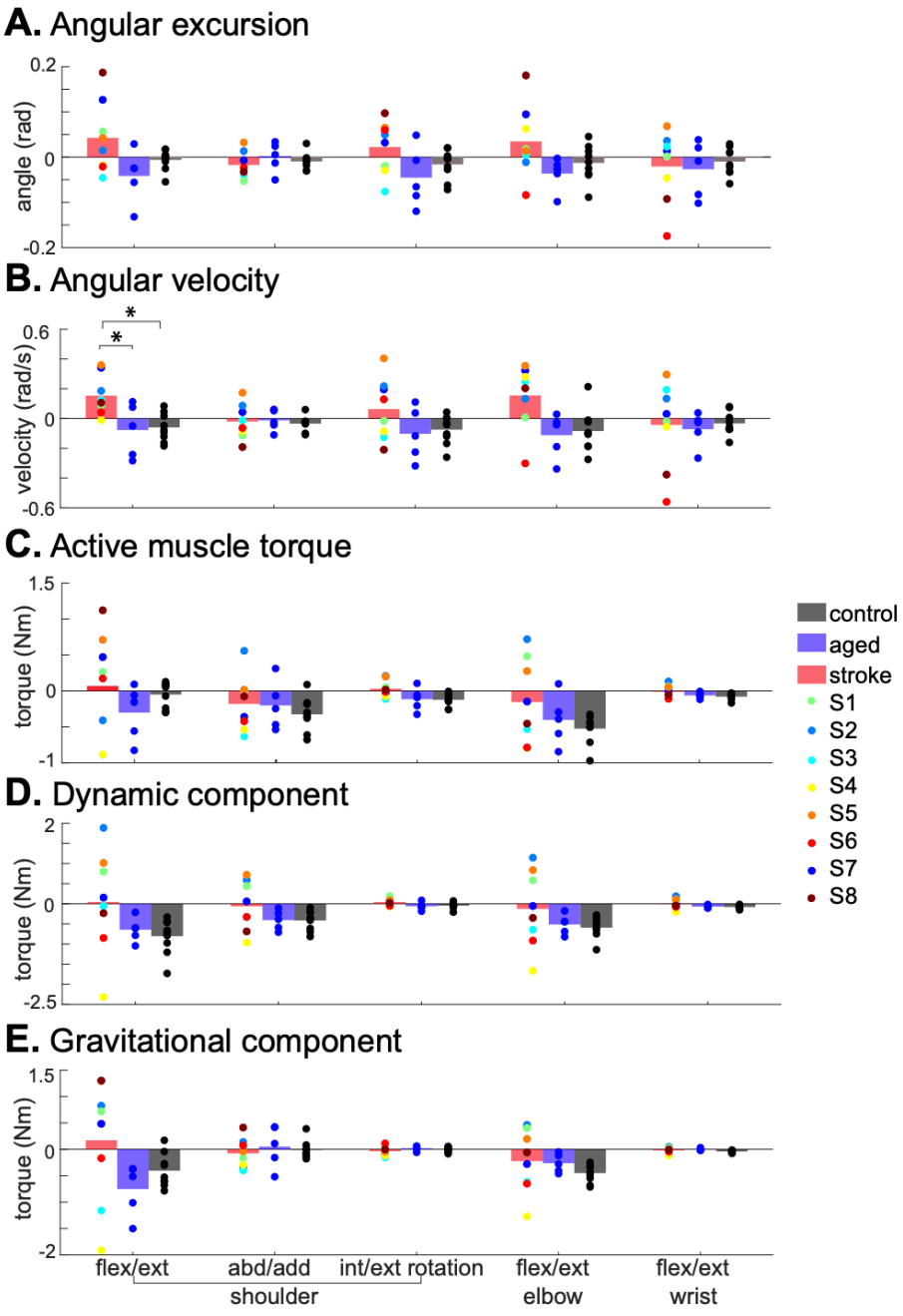
Supplementary Materials

The amplitude metric described in Methods was compared differently between limbs of the Stroke group participants. For the Control and Aged groups, the values for the non-dominant limb were subtracted from the values for the dominant limb as shown in Fig. 3. For the Stroke group, the values for the limb contralesional to stroke (more affected) were subtracted from the values for the ipsilesional limb (less affected). This resulted in less inter-subject variance within the Stroke group in the amplitude metric based on angular velocity of the shoulder flexion/extension (Suppl. Fig. S1) compared to left vs. right comparisons (Fig. 3), but not in other variables. This also shows that the movements of the contralesional arm were always slower than the movements of the ipsilesional arm (Suppl. Fig. 1B).



Supplementary Figure S1. Amplitude metric across limbs. Bars show the average difference between limbs across subjects; symbols show values for individual participants. Significantly different group comparisons due to non-overlapping confidence intervals from ANOVA model are marked by asterisks. The amplitude metric calculated based on angular excursions is shown in A, angular velocity in B, muscle torque in C, the gravitational component of muscle torque in D, and the dynamic component of muscle torque in E. Flex/ext indicates flexion and extension DOF, abd/add indicates abduction and adduction DOF, int/ext indicates internal and external rotation. Stroke group participant IDs match those in Table 1.

The repeated-measures ANOVA on the amplitude metric with contralesional vs. ipsilesional Stroke group comparisons had a significant effect of within-subject factors (F = 5.8, p = 0.005) and insignificant interaction with between-subject factor Group (F = 1.7, p = 0.159). Post-hoc comparisons between the levels of between- nor within-group factors were significant due to larger variability in the Stroke group data (Suppl. Table 1).

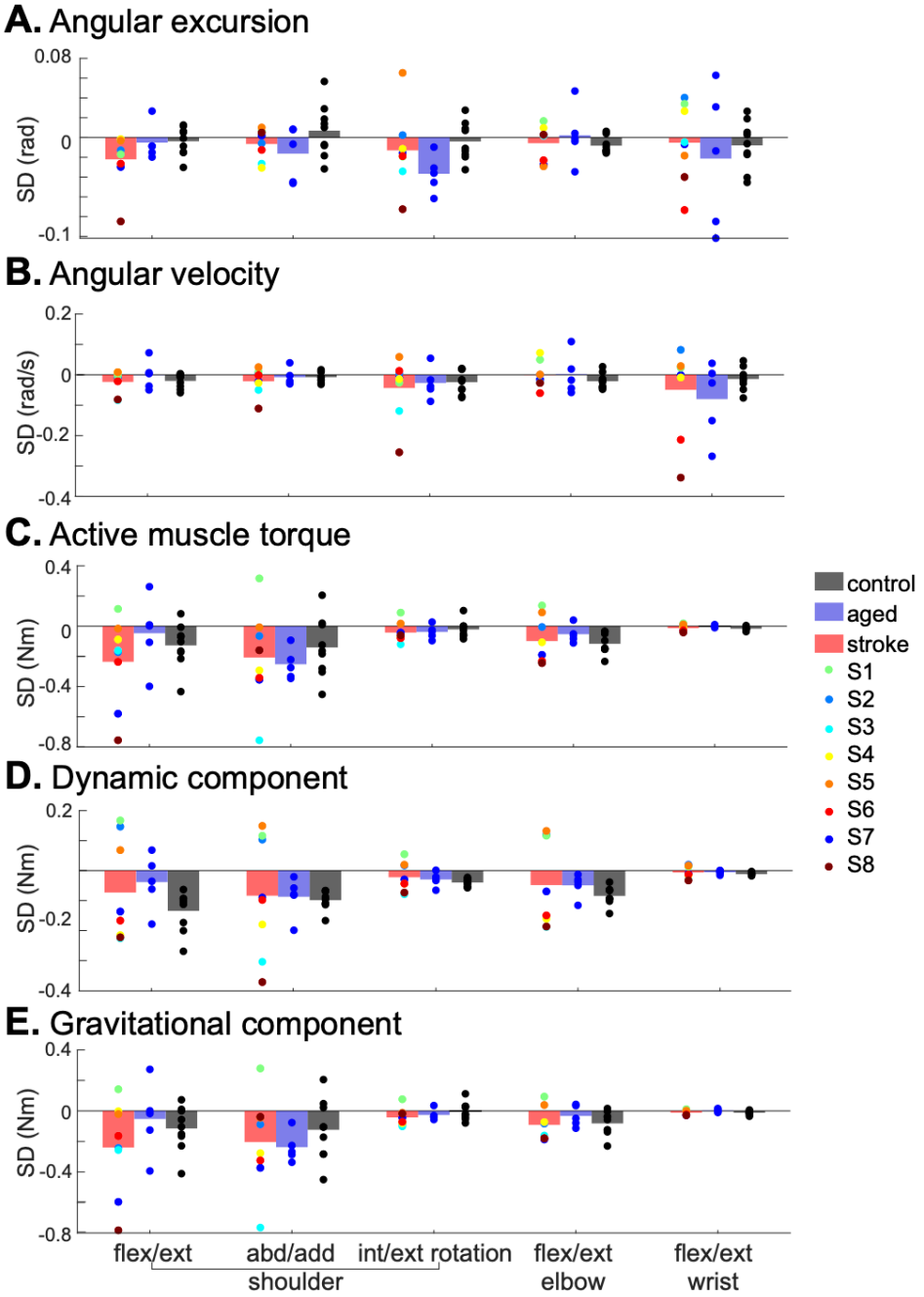
Supplementary Table S1: Post-hoc comparisons for ANOVA on amplitude metric across limbs, contralesional vs. ipsilesional for Stroke participants.

	Difference	**Standard Error**	***p***
A: Comparison between groups			
Aged – Control	0.002	0.098	1.000
Aged – Stroke	-0.163	0.100	0.259
Control – Stroke	-0.165	0.086	0.158
B: Comparison between DOFs			
Elbow F/E – Shoulder F/E	-0.044	0.045	0.859
Elbow F/E – Shoulder Ab/Ad	-0.107	0.039	0.082
Elbow F/E – Shoulder In/Ex	-0.192	0.054	0.016
Elbow F/E – Wrist F/E	-0.183	0.051	0.014
Shoulder F/E – Shoulder Ab/Ad	-0.063	0.063	0.849
Shoulder F/E – Shoulder In/Ex	-0.148	0.077	0.338
Shoulder F/E – Wrist F/E	-0.139	0.079	0.426
Shoulder Ab/Ad – Shoulder In/Ex	-0.085	0.029	0.053
Shoulder Ab/Ad – Wrist F/E	-0.075	0.033	0.202
Shoulder In/Ex rot – Wrist F/E	0.010	0.016	0.022
C: Comparison between signal types			
Angular excursion - Dynamic component	0.241	0.083	0.063
Angular excursion - Gravitational component	0.127	0.054	0.177
Angular excursion - Muscle torque	0.154	0.047	0.029
Angular excursion - Angular velocity	0.014	0.023	0.968
Angular velocity - Dynamic component	0.227	0.077	0.057
Angular velocity - Gravitational component	0.112	0.057	0.319
Angular velocity - Muscle torque	0.139	0.050	0.075
Muscle torque - Dynamic component	0.088	0.053	0.493
Muscle torque - Gravitational component	-0.027	0.029	0.883
Dynamic component - Gravitational component	-0.114	0.055	0.262

F/E stands for flexion/extension; Ab/Ad stands for abduction/adduction; In/Ex stand for internal/external rotation of the shoulder. The significant alpha corrected for repeated measures in A is equal to 0.0170; the corrected alpha in B and C is equal to 0.0051.

The intertrial metric described in Methods was also compared differently between limbs of the Stroke group participants. For the Control and Aged groups, the values for the non-dominant limb were subtracted from the values for the dominant limb as shown in Fig. 4. For the Stroke

group, the values for the limb contralesional to stroke (more affected) were subtracted from the values for the ipsilesional limb (less affected). Replotting the difference in intertrial variance between limbs in the Stroke group increased the intersubject variance in the metric based on the dynamic component of muscle torque (Suppl. Fig. S2; Fig. 4). The repeated-measures ANOVA on the intertrial variance metric had a significant effect of within-subject factors ($F = 7.8$, $p = 2e\text{-}4$) and insignificant interaction with between-subject factor Group ($F = 0.9$, $p = 0.47$). Post-hoc comparisons have shown that the amplitude metric was not significantly different between groups (Table 3A). Likewise, the differences between DOFs and signal types were insignificant (Table 3B, C). Therefore, handedness appears to be a better indicator of intertrial variance than post stroke deficits.



Supplementary Figure S2. Intertrial variance metric across limbs. The formatting of plots is as in Supplementary Figure S1.

Supplementary Table S2: Post-hoc comparisons for ANOVA on intertrial variance metric across limbs, contralesional vs. ipsilesional for Stroke participants.

	Difference	Standard Error	*p*
A: Comparison between groups			
Aged – Control	0.004	0.034	0.994
Aged – Stroke	0.019	0.035	0.852
Control – Stroke	0.015	0.030	0.866
B: Comparison between DOFs			
Elbow F/E – Shoulder F/E	0.030	0.019	0.519
Elbow F/E – Shoulder Ab/Ad	0.054	0.017	0.038
Elbow F/E – Shoulder In/Ex	-0.018	0.008	0.215
Elbow F/E – Wrist F/E	-0.029	0.009	0.043
Shoulder F/E – Shoulder Ab/Ad	0.024	0.024	0.860
Shoulder F/E – Shoulder In/Ex	-0.048	0.021	0.180
Shoulder F/E – Wrist F/E	-0.059	0.022	0.101
Shoulder Ab/Ad – Shoulder In/Ex	-0.072	0.019	0.008
Shoulder Ab/Ad – Wrist F/E	-0.083	0.024	0.017
Shoulder In/Ex rot – Wrist F/E	-0.011	0.007	0.615
C: Comparison between signal types			
Angular excursion - Dynamic component	0.044	0.015	0.056
Angular excursion - Gravitational component	0.075	0.020	0.009
Angular excursion - Muscle torque	0.085	0.021	0.006
Angular excursion - Angular velocity	0.013	0.008	0.493
Angular velocity - Dynamic component	0.032	0.013	0.171
Angular velocity - Gravitational component	0.062	0.018	0.020
Angular velocity - Muscle torque	0.072	0.019	0.009
Muscle torque - Dynamic component	-0.040	0.015	0.095
Muscle torque - Gravitational component	-0.010	0.005	0.290
Dynamic component - Gravitational component	0.030	0.017	0.384

F/E stands for flexion/extension; Ab/Ad stands for abduction/adduction; In/Ex stand for internal/external rotation of the shoulder. The significant alpha corrected for repeated measures in A is equal to 0.0170; the corrected alpha in B and C is equal to 0.0051.