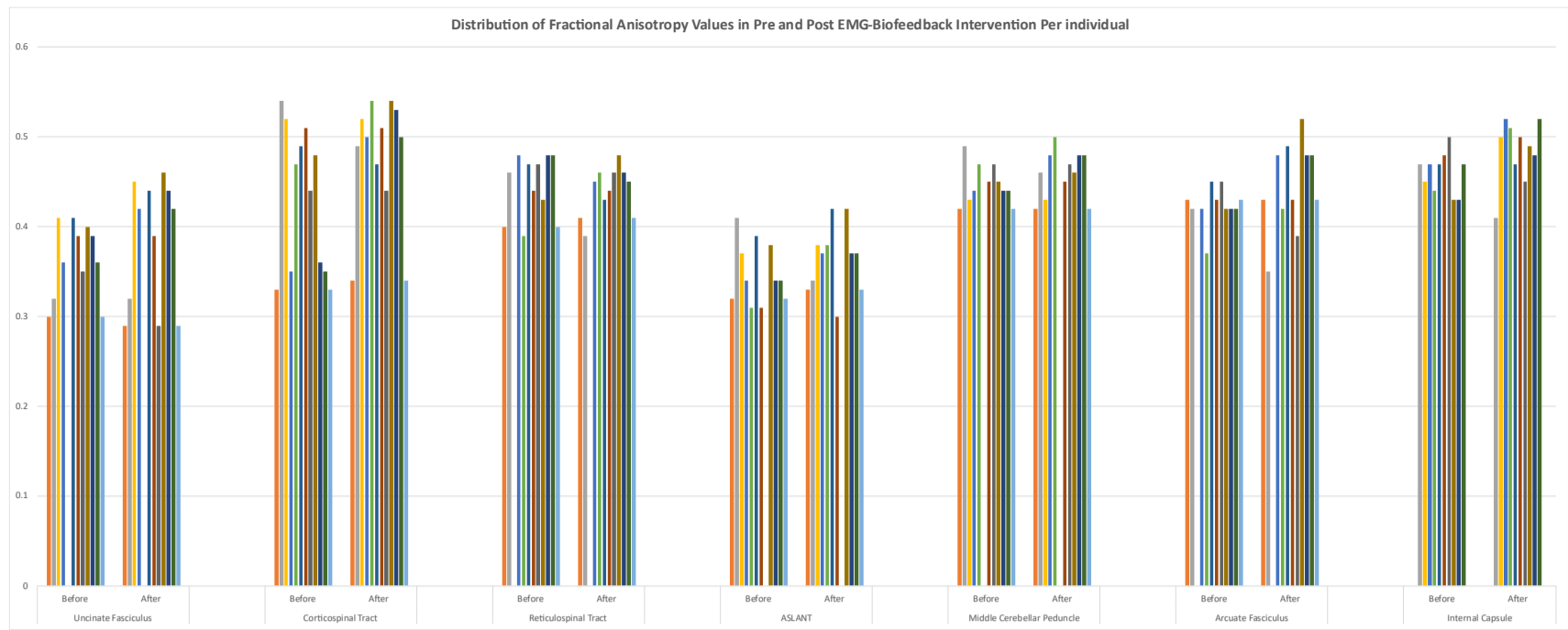
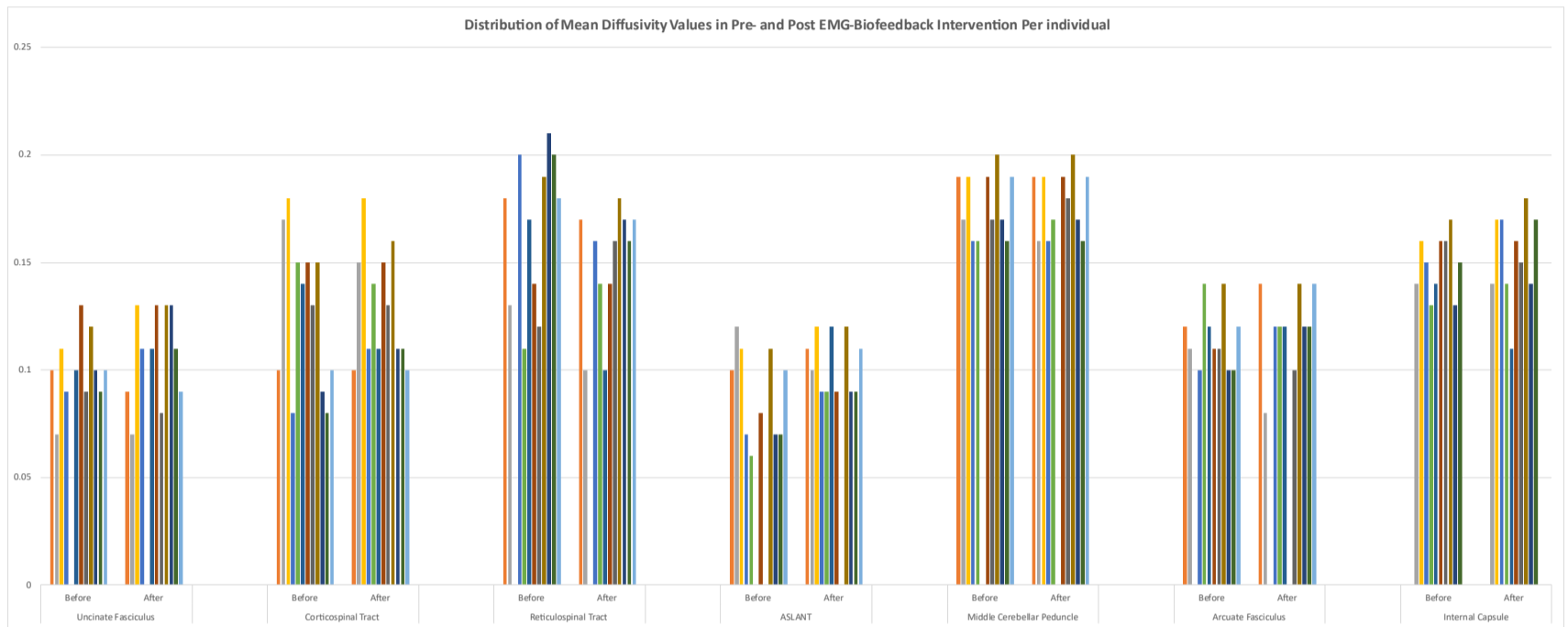
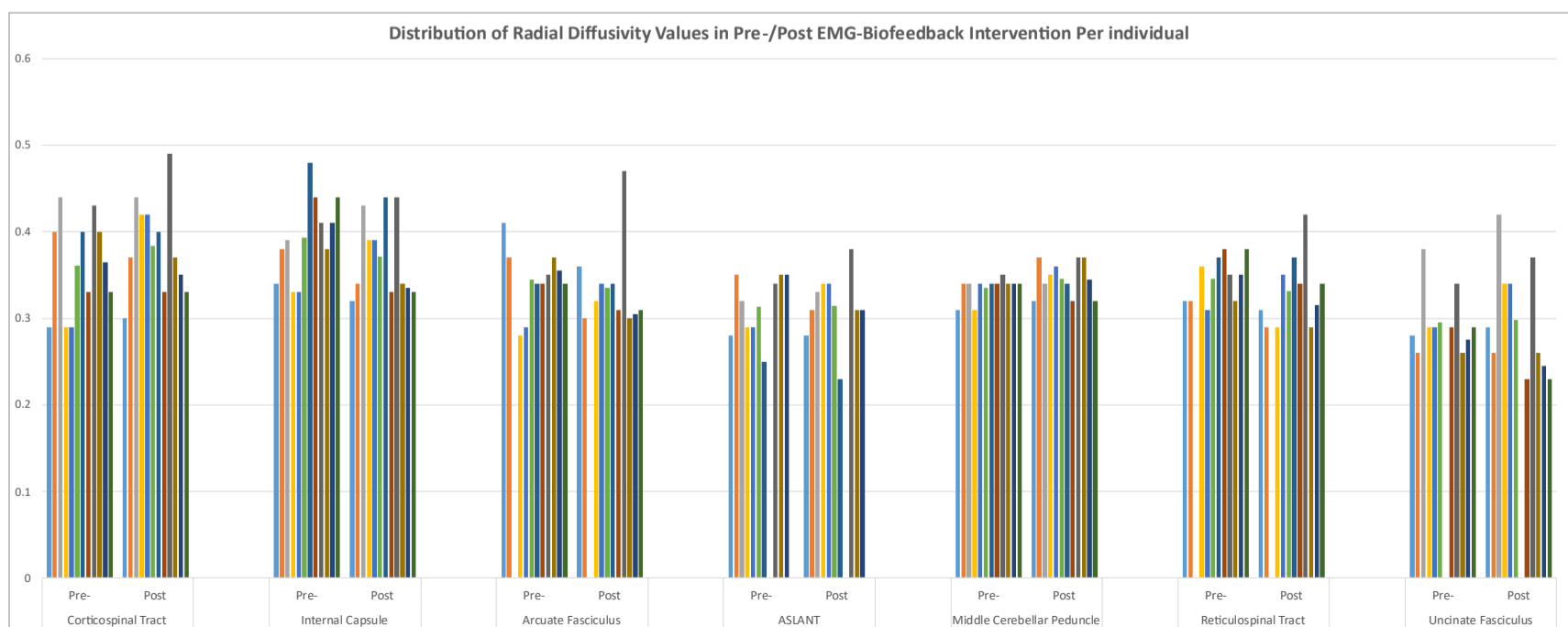


Appendix 1. Pre-/Post Comparisons of Movement Related and Behavioral Parameters

Measurements		Intervention Intervals	Descriptive Statistics			Analytical Statistics														
			Within Groups		Between Session	Correlations		Parametric Test						Non-Parametric Tests						
			Mean (SD)	SEM	Diff. Dist.	p-value	Corr.	Paired T-Test			Paired Samples Effect Sizes			Related-Samples Wilcoxon Signed Rank						
								p-value	t-Value	95% CI	Cohen		Hedges		Sign	Wilcoxon	Kendall's Coefficient	Hodges-Lehman		
Fugl Meyer	Upper Extremity	Pre-	23.25 (8.42)	2.43	0.007	<0.001	0.96	0.01	-2.93	-3.21 - -0.45	-0.84	-1.49 - -1.49	-0.81	-1.45 - -0.16	0.00	0.01	0.00	1.50	0.50 - 3.50	
		Post	25.83 (8.17)	2.35																
	Wrist	Pre-	5.58 (2.96)	0.85	<0.001	<0.001	0.97	0.10	-1.77	-0.74 - 0.08	-0.51	-1.10 - 0.10	-0.49	-1.06 - 0.09	0.25	0.10	0.08	0.00	0.00 - 0.50	
		Post	5.91 (3.11)	0.89																
	Hand	Pre-	7.16 (4.52)	1.30	0.018	<0.001	0.96	<0.01	-3.56	-2.02 - -0.47	-1.02	-1.72 - -0.30	-0.99	-1.66 - -0.29	0.00	0.01	0.00	1.00	0.50 - 2.00	
		Post	8.41 (4.16)	1.20																
Total	Pre-	36.00 (4.38)	15.18	0.209	<0.001	0.98	0.00	-3.90	-5.34 - -1.49	-1.12	-1.84 - -0.38	-1.08	-1.78 - -0.36	0.00	0.01	0.00	3.50	1.50 - 5.50		
	Post	39.41 (4.27)	14.79																	
Ashworth		Pre-	1.83 (1.07)	0.30	<0.001	<0.001	0.95	0.05	2.15	-0.004 - 0.420	0.623	-0.01 - 1.23	0.06	-0.01 - 1.19	0.12	0.05	0.04	-0.25	-0.50 - 0.00	
		Post	1.62 (1.06)	0.30																
Barthel	Daily Routine	Pre-	55.83 (16.21)	4.68	<0.001	<0.001	0.93	0.24	-1.23	-5.78 - 1.61	-0.358	-0.93 - 0.23	-0.34	-0.90 - 0.22	0.50	0.18	0.15	0.00	0.00 - 02.50	
		Post	57.91 (14.21)	4.10																
	Tool Usage	Pre-	57.91 (29.73)	8.58	<0.001	<0.001	0.99	0.33	-1.00	-2.66 - 1.00	-0.28	-0.86 - 0.29	-0.27	-0.83 - 0.28	1.00	0.31	0.31	0.00	0.00 - 0.00	
		Post	58.75 (30.53)	8.81																
	Total	Pre-	113.75 (12.80)	44.37	<0.001	<0.001	0.99	0.13	-1.02	-6.85 - 1.02	-0.47	-1.05 - 0.13	-0.45	-1.02 - 0.13	0.25	0.10	0.08	0.00	0.00 - 5.00	
		Post	116.66 (12.58)	43.60																
EMG - Biofeedback	Rest	Pre-	14.83 (6.67)	1.92	0.069	0.599	0.16	0.02	2.52	0.73 - 10.76	0.72	0.07 - 1.35	0.70	0.07 - 1.31	0.03	0.02	0.02	-5.50	-11.00 - -1.50	
		Post	9.08 (5.48)	1.58																
	Tension	Pre-	30.75 (1.51)	5.63	0.647	0.03	0.62	<0.001	-6.64	-44.03 - -22.13	-1.91	-2.87 - -0.93	-1.85	-2.77 - -0.90	<0.001	0.02	<0.001	31.75	21.00 - 43.50	
		Post	63.83 (20.22)	5.83																
	rCMS	Pre-	10.66 (3.30)	2.43	0.014	<0.001	0.98	0.01	-2.78	-3.13 - -0.36	-0.80	-1.44 - -0.13	-0.77	-1.39 - -0.12	0.01	0.05	0.00	1.50	0.00 - 3.50	
		Post	16.54 (17.41)	2.35																
PP	Pre-	30.40 (9.50)	0.85	<0.001	0.012	0.69	0.42	0.83	-6.93 - 15.43	0.24	-0.33 - 0.81	0.23	-0.32 - 0.78	0.21	0.05	0.10	0.50	0.00 - 1.50		
	Post	31.99 (7.09)	0.89																	
iRMS	Pre-	10.65 (3.31)	1.30	0.006	<0.001	0.95	0.01	-2.74	-6.30 - -0.69	-0.79	-1.43 - -0.12	-0.76	-1.38 - -0.12	0.00	0.05	0.00	2.25	1.00 - 7.00		
	Post	11.19 (2.46)	1.20																	
Goniometry	WF	Pre-	58.75 (14.62)	4.22	0.014	<0.001	0.98	0.01	-2.78	-3.13 - -0.36	-0.80	-1.44 - -0.13	-0.77	-1.39 - -0.12	0.01	0.01	0.00	1.50	0.00 - 3.50	
		Post	60.50 (14.76)	4.26																
	WE	Pre-	23.91 (24.41)	7.04	<0.001	0.012	0.69	0.42	0.83	-6.93 - 15.43	0.24	-0.33 - 0.81	0.23	-0.32 - 0.78	0.21	0.34	0.10	0.50	0.00 - 1.50	
		Post	19.66 (18.99)	5.48																
	MPF	Pre-	64.41 (14.34)	4.14	0.006	<0.001	0.95	0.01	-2.74	-6.30 - -0.69	-0.79	-1.43 - -0.12	-0.76	-1.38 - -0.12	0.00	0.00	0.00	2.25	1.00 - 7.00	
		Post	67.91 (15.44)	4.45																
	Pip	Pre-	59.25 (19.57)	5.65	0.005	<0.001	0.99	0.01	-2.77	-3.43 - -0.39	-0.80	-1.44 - -0.13	-0.77	-1.39 - -0.12	0.00	0.01	0.00	1.00	0.50 - 3.50	
		Post	61.16 (19.3)	5.49																
	Dip	Pre-	53.16 (17.31)	4.99	0.016	<0.001	0.91	0.21	-1.32	-7.32 - 1.82	-0.38	-0.96 - 0.21	-0.36	-0.92 - 0.20	0.12	0.12	0.05	1.50	0.00 - 6.50	
		Post	55.91 (18.25)	5.26																
ThMp	Pre-	38.83 (14.49)	4.18	0.004	<0.001	0.99	0.01	-2.86	-2.35 - -0.30	-0.82	-1.47 - -0.15	-0.79	-1.42 - -0.14	0.00	0.01	0.00	1.00	0.50 - 2.50		
	Post	40.16 (14.67)	4.23																	
ThPip	Pre-	35.58 (10.32)	2.98	0.031	<0.001	0.95	0.02	-2.63	-4.43 - -0.39	-0.76	-1.39 - -0.10	-0.73	-1.34 - -0.09	0.03	0.01	0.02	2.00	0.50 - 4.50		
	Post	38.00 (10.66)	3.07																	
Total	Pre-	33.91 (24.25)	84.01	0.019	<0.001	0.97	0.14	-1.56	-22.69 - 3.86	-0.45	-1.03 - 0.15	-0.43	-1.00 - 0.14	0.00	0.03	0.00	8.75	3.00 - 20.00		
	Post	34.33 (25.33)	87.74																	

Appendix 1. Pre- and post-intervention comparisons across functional, electrophysiological, and kinematic parameters using descriptive, parametric, and non-parametric statistics.

This table summarizes within-subject changes across multiple domains following an 8-week EMG biofeedback intervention in individuals with chronic stroke. Outcomes include functional motor performance (Fugl-Meyer Upper Extremity scores), spasticity (Modified Ashworth Scale), activities of daily living (Barthel Index), surface EMG features (Rest amplitude, Tension amplitude, cRMS, peak-to-peak, iRMS), and joint mobility parameters derived from goniometry (e.g., wrist flexion, MCP flexion, PIP/DIP range, thumb metrics, and total angle scores). Descriptive statistics (mean, standard deviation, standard error of the mean) are reported for each variable at pre- and post-intervention time points. Analytical statistics include paired-sample *t*-tests (with corresponding *t*-values and 95% confidence intervals), effect size estimates (Cohen's *d* and Hedges' *g*), and non-parametric alternatives including the Wilcoxon signed-rank test, sign test, Kendall's coefficient of concordance, and Hodges–Lehmann estimators with confidence intervals. Statistical significance is interpreted at the conventional threshold of *p* < 0.05, and effect sizes are reported to contextualize the magnitude of observed changes. Parameters showing consistent significance across both parametric and non-parametric tests are considered robust indicators of intervention-related improvement in motor function, spasticity modulation, EMG signal regulation, and joint mobility.

A**B****C****D**

Appendix 2. Changes in Diffusion Metrics Pre- and Post-EMG-Biofeedback Intervention Across Multiple White Matter Tracts

This figure presents the distribution of diffusion metrics, including Fractional Anisotropy (FA), Mean Diffusivity (MD), Axial Diffusivity (AD), and Radial Diffusivity (RD), across various white matter tracts before and after EMG-biofeedback intervention, evaluated for each individual. **Panel A:** Distribution of Fractional Anisotropy (FA) values across different tracts such as the Uncinate Fasciculus, Corticospinal Tract, and ASLANT, showing inter-individual variability in response to the intervention. **Panel B:** Mean Diffusivity (MD) values demonstrate changes pre- and post-intervention, with notable differences observed in the Corticospinal Tract, Middle Cerebellar Peduncle, and Arcuate Fasciculus. **Panel C:** Axial Diffusivity (AD) values are compared before and after the intervention, highlighting changes in tracts such as the Internal Capsule, ASLANT, and Reticulospinal Tract. **Panel D:** Radial Diffusivity (RD) values reveal shifts across the Corticospinal Tract, Middle Cerebellar Peduncle, and Uncinate Fasciculus following the intervention. The bar graphs indicate individual responses to the EMG-biofeedback intervention, with varying degrees of changes across the diffusion metrics. These results suggest differential impacts of the intervention on white matter integrity, with specific tracts showing more pronounced alterations. The figure highlights the potential for using diffusion metrics to assess the effectiveness of neurorehabilitative interventions on white matter pathways.

Appendix 3: Comprehensive Analytical Statistics for Left and Right Brain Hemispheres: Correlations, Paired T-Tests, and Non-Parametric Tests Pre- and Post-Intervention Left Side

		Intervention Intervals	Descriptive		Analytical Statistics														
			Within Groups		Correlations		Parametric Test						Non-Parametric Test						
							Paired T-Test			Paired Samples Effect Sizes			Sign			Wilcoxon		Kendall's Coefficient	Hodges-Lehman
			Mean (SD)	SEM	p-value	Corr.	p-value.	t-Valu	CI	p-value	CI	Sig.	CI	p-value	p-value	p-value	Estimate	Estimate	CI
CST	FA	Pre-	0.31 (0.10)	0.030	<0.001	0.94	0.05	0.49	-0.03 – 0.00	0.05	-1.07 – 0.12	0.49	-1.04 – 0.11	0.09	0.18	0.06	0.09	0.18	-3.21 – -0.45
		Post	0.33 (0.11)	0.032															
	MD	Pre-	0.10 (0.10)	0.029	<0.001	0.84	0.57	0.84	-0.04 – 0.07	0.57	-0.39 – 0.74	0.84	-0.38 – 0.71	0.73	0.1	0.76	0.73	0.1	-0.74 – 0.08
		Post	0.09 (0.03)	0.009															
	AD	Pre-	0.38 (0.12)	0.035	<0.001	0.51	0.66	0.81	-0.05 – 0.01	0.51	-0.95 – 0.22	0.66	-0.91 – 0.21	0.85	0.10	0.85	0.10	0.85	-2.02 – -0.47
		Post	0.40 (0.12)	0.039															
	RD	Pre-	0.10 (0.03)	0.010	<0.001	0.2	0.08	0.31	-0.01 – 0.03	0.2	-0.37 – 0.77	0.08	-0.35 – 0.74	0.76	0.77	0.76	0.77	0.76	-5.34 – -1.49
		Post	0.09 (0.04)	0.013															
RS	FA	Pre-	0.43 (0.08)	0.023	<0.001	0.54	0.53	0.85	-0.09 – 0.00	0.10	-1.23 – 0.00	0.85	-1.19 – 0.00	0.10	0.85	0.10	0.85	1.85	-0.004 – 0.420
		Post	0.47 (0.06)	0.020															
	MD	Pre-	0.12 (0.03)	0.010	<0.001	0.22	0.09	0.76	-0.01 – 0.00	0.77	-0.73 – 0.40	0.76	-0.70 – 0.39	0.77	0.76	0.77	0.76	0.77	-5.78 – 1.61
		Post	0.13 (0.02)	0.007															
	AD	Pre-	0.40 (0.13)	0.038	<0.001	0.51	0.60	1.85	-0.02 – 0.02	0.44	-0.50 – 0.62	0.85	-0.48 – 0.60	1.44	1.85	1.44	1.85	0.49	-2.66 – 1.00
		Post	0.40 (0.12)	0.037															
	RD	Pre-	0.15 (0.5)	0.016	<0.001	0.2	0.16	0.77	-0.00 – 0.03	2.11	-0.14 – 1.05	0.77	-0.13 – 1.01	2.11	0.77	2.11	0.77	0.84	-6.85 – 1.02
		Post	0.13 (0.5)	0.014															
AF	FA	Pre-	0.38 (0.12)	0.035	<0.001	0.10	0.7	2.11	-0.05 – 0.01	0.77	-0.95 – 0.22	0.11	-0.91 – 0.21	0.81	0.10	-0.53	0.81	0.10	0.73 – 10.76
		Post	0.40 (0.12)	0.039															
	MD	Pre-	0.10 (0.03)	0.010	<0.001	0.1	0.49	0.05	-0.01 – 0.03	0.49	-0.37 – 0.77	0.05	-0.35 – 0.74	0.31	0.1	0.09	0.31	0.1	-44.03 – 22.13
		Post	0.09 (0.04)	0.013															
	AD	Pre-	0.31 (0.10)	0.030	<0.001	0.5	0.84	0.57	-0.03 – 0.00	0.84	-1.07 – 0.12	0.85	-1.04 – 0.11	0.10	0.85	0.10	0.73	0.5	-3.13 – -0.36
		Post	0.33 (0.11)	0.032															
	RD	Pre-	0.10 (0.10)	0.029	<0.001	1.01	0.50	0.91	-0.04 – 0.07	0.50	-0.39 – 0.74	0.76	-0.38 – 0.71	0.77	0.76	0.77	1.15	1.01	-6.93 – 15.43
		Post	0.09 (0.03)	0.009															
IC	FA	Pre-	0.40 (0.13)	0.038	<0.001	0.10	0.07	1.57	-0.02 – 0.02	0.10	-0.50 – 0.62	0.85	-0.48 – 0.60	1.44	1.85	1.44	1.57	0.10	-6.30 – -0.69
		Post	0.40 (0.12)	0.037															
	MD	Pre-	0.15 (0.5)	0.016	<0.001	0.34	0.44	0.09	-0.00 – 0.03	0.34	-0.14 – 1.05	0.77	-0.13 – 1.01	2.11	0.77	2.11	0.09	0.34	-3.13 – -0.36
		Post	0.13 (0.5)	0.014															
	AD	Pre-	0.43 (0.08)	0.023	<0.001	0.1	0.44	0.73	-0.09 – 0.00	0.1	-1.23 – 0.00	0.49	-1.19 – 0.00	0.05	0.49	0.05	0.73	0.1	-6.93 – 15.43
		Post	0.47 (0.06)	0.020															
	RD	Pre-	0.12 (0.03)	0.010	<0.001	0.10	0.04	0.81	-0.01 – 0.00	0.10	-0.73 – 0.40	0.84	-0.70 – 0.39	0.57	0.84	0.57	0.81	0.10	-6.30 – -0.69
		Post	0.13 (0.02)	0.007															

Appendix 4: Comprehensive Analytical Statistics for Left and Right Brain Hemispheres: Correlations, Paired T-Tests, and Non-Parametric Tests Pre- and Post-Intervention Right Side

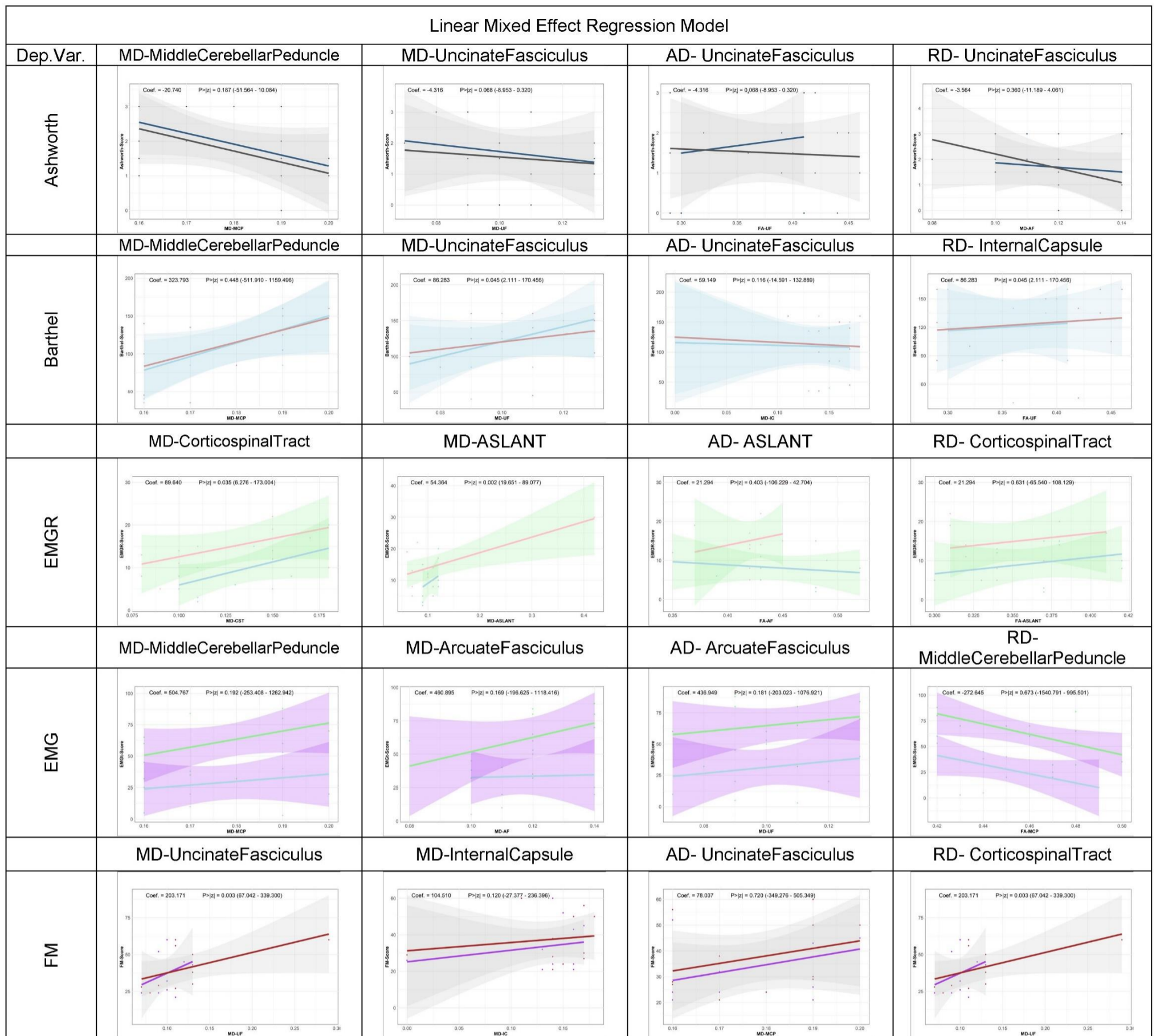
		Intervention Intervals	Analytical Statistics													
			Correlations		Parametric Test						Non-Parametric Test					
					Paired T-Test			Paired Samples Effect Sizes			Related-Samples Wilcoxon Signed Rank					
			p-value	Corr.	p-value	t-Value	95% CI	p-value	95% CI	p-value	95% CI	Sign	Wilcoxon	Kendall's Coefficient	Hodges-Lehman CI	
CST	FA	Pre-	0.10	0.49	0.05	-2.17	-0.09 – 0.00	0.62	-1.23 – 0.00	-0.60	-1.19 – 0.00	0.18	0.06	0.09	0.03	0.00 – 0.08
		Post														
	MD	Pre-	<0.001	0.84	0.57	-0.58	-0.01 – 0.00	0.01	-0.73 – 0.40	-0.16	-0.70 – 0.39	0.01	0.76	0.73	0.00	-0.01 – 0.01
		Post														
	AD	Pre-	0.31	0.50	0.91	0.49	-0.04 – 0.01	0.55	-1.16 – 0.11	-0.53	-1.12 – 0.11	0.51	0.66	0.81	0.02	-0.00 – 0.05
		Post														
	RD	Pre-	0.73	1.84	0.94	0.08	-0.01 – 0.03	0.09	-0.48 – 0.65	0.09	-0.46 – 0.63	0.02	0.08	0.31	0.00	-0.01 – 0.01
		Post														
RS	FA	Pre-	<0.001	0.95	0.82	-0.53	-0.02 – 0.02	0.04	-0.50 – 0.62	0.06	-0.48 – 0.060	0.54	-0.53	0.73	-0.00	-0.02 – 0.02
		Post														
	MD	Pre-	<0.001	0.84	0.13	0.09	-0.00 – 0.03	0.46	-0.14 – 1.05	0.44	-0.13 – 1.01	0.22	0.09	1.15	-0.01	-0.03 – 0.00
		Post														
	AD	Pre-	0.81	1.85	0.08	-0.60	-0.04 – 0.01	0.55	-1.16 – 0.11	-0.53	-1.12 – 0.11	0.51	-0.60	1.57	0.03	0.00 – 0.08
		Post														
	RD	Pre-	0.31	0.77	0.53	-0.16	-0.01 – 0.03	0.09	-0.48 – 0.65	0.09	-0.46 – 0.63	0.02	-0.16	0.09	0.00	-0.01 – 0.01
		Post														
AF	FA	Pre-	<0.001	2.85	0.09	-0.53	-0.05 – 0.01	-0.37	-0.95 – 0.22	0.09	-0.70	0.10	-0.53	0.81	0.00	-0.02 – 0.01
		Post														
	MD	Pre-	0.01	0.21	0.60	0.09	-0.01 – 0.03	0.20	-0.71 – 0.77	0.06	-0.35 – 0.74	0.01	0.09	0.31	0.00	-0.02 – 0.01
		Post														
	AD	Pre-	0.44	0.7	0.16	0.06	-0.01 – 0.06	0.12	-0.48 – 0.68	0.08	-0.46 – 0.66	0.05	0.06	0.73	0.02	-0.00 – 0.05
		Post														
	RD	Pre-	0.44	1.84	0.53	0.08	-0.02 – 0.01	-0.37	-0.95 – 0.23	-0.53	-0.91 – 0.22	1.01	0.08	1.15	0.00	-0.02 – 0.01
		Post														
IC	FA	Pre-	<0.001	0.97	0.10	-1.76	-0.04 – 0.00	-0.50	-1.10 – 0.10	0.09	-1.06 – 0.10	0.10	0.07	1.57	0.02	-0.00 – 0.05
		Post														
	MD	Pre-	-0.01	0.97	0.49	-0.70	-0.01 – 0.00	-0.20	-0.77 – 0.37	-0.60	-0.74 – 0.35	0.34	0.44	0.09	0.00	-0.02 – 0.01
		Post														
	AD	Pre-	0.44	0.76	0.77	0.28	-0.01 – 0.02	0.08	-0.48 – 0.64	-0.16	-0.46 – 0.62	0.01	0.44	0.73	0.02	-0.00 – 0.05
		Post														
	RD	Pre-	0.50	0.97	0.10	-1.76	-0.04 – 0.00	-0.50	-1.10 – 0.10	-0.49	-1.06 – 0.10	0.10	0.07	0.81	0.00	-0.02 – 0.01
		Post														
UF	FA	Pre-	<0.001	0.85	0.10	-1.80	-0.04 – 0.00	-0.54	-1.16 – 0.10	-0.52	-1.12 – 0.10	0.50	0.21	0.31	0.02	-0.00 – 0.05
		Post														
	MD	Pre-	0.004	0.76	0.77	0.28	-0.01 – 0.02	0.08	-0.48 – 0.64	0.08	-0.46 – 0.62	0.01	0.44	0.73	0.00	-0.01 – 0.01
		Post														
	AD	Pre-	0.09	1.85	0.44	2.36	-0.04 – 0.01	-0.55	-1.16 – 0.11	-0.53	-1.12 – 0.11	0.51	0.67	1.15	-0.00	-0.02 – 0.02
		Post														
	RD	Pre-	0.73	0.77	0.11	4.44	-0.01 – 0.03	0.09	-0.48 – 0.65	0.09	-0.46 – 0.63	0.02	0.90	1.57	-0.01	-0.03 – 0.00
		Post														
ASLNT	FA	Pre-	<0.001	0.94	0.09	-0.53	-0.04 – 0.02	-0.56	-1.16 – 0.12	-0.54	-1.12 – 0.12	0.52	-0.53	0.73	0.02	0.00 – 0.03
		Post														
	MD	Pre-	0.068	0.54	0.60	0.09	-0.01 – 0.04	0.10	-0.48 – 0.66	0.10	-0.46 – 0.64	0.03	0.09	0.81	0.00	-0.00 – 0.01
		Post														
	AD	Pre-	0.73	1.85	0.16	0.06	-0.04 – 0.03	-0.57	-1.16 – 0.13	0.08	-1.12 – 0.13	0.53	0.06	0.31	0.02	-0.00 – 0.05
		Post														
	RD	Pre-	0.81	0.77	0.53	0.08	-0.01 – 0.05	0.11	-0.48 – 0.67	-0.53	-0.46 – 0.65	0.04	0.08	0.73	0.00	-0.01 – 0.01
		Post														
MCP	FA	Pre-	<0.001	0.98	0.09	-0.53	-0.02 – 0.00	-0.37	-0.95 – 0.22	0.09	-0.91 – 0.21	1.00	-0.53	1.15	0.00	-0.00 – 0.02
		Post														
	MD	Pre-	<0.001	0.99	0.06	0.09	-0.00 – 0.00	-0.13	-0.69 – 0.44	-0.60	-0.67 – 0.42	0.01	0.09	1.57	0.02	-0.00 – 0.05
		Post														
	AD	Pre-	0.73	1.85	0.08	-0.60	-0.04 – 0.02	-0.56	-1.16 – 0.12	-0.16	-1.12 – 0.12	0.52	-0.60	0.09	0.00	-0.02 – 0.01
		Post														
	RD	Pre-	0.81	0.77	0.53	-0.16	-0.01 – 0.04	0.10	-0.48 – 0.66	-0.53	-0.46 – 0.64	0.03	-0.16	0.73	0.02	-0.00 – 0.05
		Post														

Appendix 5: Comprehensive Bayesian Analysis for Left and Right Brain Hemispheres

		Item	Posterior Mean (μ)	Posterior SD (σ)	95% Credible Interval	$P(\mu > 0)$	Bayes Factor BF_{10}	ROPE (%)	Effect Size (Bayesian d)	HDI (95%)
CST	Right Hemisphere	FA	0.045812	0.021367	[0.0039, 0.0877]	0.983987	0.212806	4.06	0.618801	[0.0040, 0.0876]
		MD	0.0025	0.00524	[-0.0078, 0.0128]	0.683338	0.005872	91.4	0.137712	[-0.0077, 0.0128]
		AD	0.022075	0.019238	[-0.0156, 0.0598]	0.874404	0.03716	21.33	0.331182	[-0.0154, 0.0597]
		RD	0.022911	0.015958	[-0.0084, 0.0542]	0.924457	0.044727	19.44	0.4144	[-0.0088, 0.0544]
	Left Hemisphere	FA	0.003333	0.014786	[-0.0256, 0.0323]	0.589159	0.015167	48.73	0.065055	[-0.0260, 0.0331]
		MD	0.004166	0.010763	[-0.0169, 0.0253]	0.650659	0.0116	61.09	0.11174	[-0.0171, 0.0252]
		AD	0.002499	0.01513	[-0.0272, 0.0322]	0.565604	0.015338	47.32	0.047682	[-0.0280, 0.0330]
		RD	0.019995	0.016235	[-0.0118, 0.0518]	0.890951	0.03466	24.43	0.355486	[-0.0113, 0.0520]
RS	Right Hemisphere	FA	-0.005	0.011043	[-0.0266, 0.0166]	0.32538	0.012235	58.21	-0.13068	[-0.0267, 0.0170]
		MD	-0.015	0.009003	[-0.0326, 0.0026]	0.047859	0.036064	28.29	-0.48091	[-0.0331, 0.0026]
		AD	0.001833	0.009196	[-0.0162, 0.0199]	0.579004	0.009381	71.67	0.057544	[-0.0162, 0.0196]
		RD	-0.01329	0.010945	[-0.0347, 0.0082]	0.112329	0.022876	36.57	-0.3505	[-0.0347, 0.0082]
	Left Hemisphere	FA	-0.015	0.008211	[-0.0311, 0.0011]	0.033872	0.043549	27.15	-0.52731	[-0.0315, 0.0015]
		MD	0.028256	0.05228	[-0.0742, 0.1307]	0.705565	0.060501	12.9	0.155808	[-0.0769, 0.1322]
		AD	-0.01	0.008071	[-0.0258, 0.0058]	0.107698	0.017387	48.87	-0.35762	[-0.0258, 0.0059]
		RD	0.006666	0.006552	[-0.0062, 0.0195]	0.845536	0.010994	69.28	0.293713	[-0.0062, 0.0195]
IC	Right Hemisphere	FA	0.019997	0.01237	[-0.0042, 0.0442]	0.94702	0.045694	20.48	0.466642	[-0.0042, 0.0440]
		MD	0.003333	0.003957	[-0.0044, 0.0111]	0.800223	0.005642	95.24	0.243183	[-0.0045, 0.0113]
		AD	0.000833	0.015346	[-0.0292, 0.0309]	0.521649	0.015368	48.6	0.015671	[-0.0297, 0.0306]
		RD	-0.02208	0.017246	[-0.0559, 0.0117]	0.100257	0.039131	20.81	-0.36948	[-0.0557, 0.0117]
	Left Hemisphere	FA	0.006666	0.010824	[-0.0145, 0.0279]	0.731002	0.013084	54.71	0.177769	[-0.0150, 0.0280]
		MD	0.001667	0.003218	[-0.0046, 0.0080]	0.697759	0.00368	99.5	0.149523	[-0.0045, 0.0080]
		AD	0.007499	0.010739	[-0.0135, 0.0285]	0.757506	0.013704	54.44	0.201571	[-0.0135, 0.0286]
		RD	0.027493	0.015767	[-0.0034, 0.0584]	0.959391	0.072106	12.36	0.50329	[-0.0037, 0.0581]
AF	Right Hemisphere	FA	0.019996	0.014718	[-0.0089, 0.0488]	0.912861	0.037038	23.12	0.392147	[-0.0086, 0.0484]
		MD	-0.00583	0.010692	[-0.0268, 0.0151]	0.292698	0.012407	58.06	-0.15747	[-0.0266, 0.0155]
		AD	-0.01375	0.018225	[-0.0495, 0.0220]	0.225357	0.02422	31.89	-0.21769	[-0.0489, 0.0223]
		RD	-0.00825	0.016133	[-0.0399, 0.0234]	0.304589	0.018385	40.64	-0.14757	[-0.0397, 0.0238]
	Left Hemisphere	FA	-0.0025	0.012559	[-0.0271, 0.0221]	0.421123	0.012811	56.51	-0.05745	[-0.0266, 0.0224]
		MD	5.78E-18	0.007487	[-0.0147, 0.0147]	0.5	0.007487	81.63	2.23E-16	[-0.0146, 0.0148]
		AD	0.009165	0.014638	[-0.0195, 0.0379]	0.734365	0.017808	42.54	0.180711	[-0.0191, 0.0377]
		RD	0.008332	0.010789	[-0.0128, 0.0295]	0.780034	0.014538	51.45	0.222933	[-0.0125, 0.0290]
UF	Right Hemisphere	FA	0.018331	0.010859	[-0.0030, 0.0396]	0.954307	0.045145	21.37	0.487291	[-0.0029, 0.0397]
		MD	0.006667	0.003957	[-0.0011, 0.0144]	0.95399	0.016359	79.8	0.486366	[-0.0010, 0.0144]
		AD	0.039371	0.03417	[-0.0276, 0.1063]	0.875378	0.066362	12.05	0.332414	[-0.0292, 0.1066]
		RD	0.00275	0.010877	[-0.0186, 0.0241]	0.599789	0.01123	62.63	0.072973	[-0.0188, 0.0238]
ASLANT	Right Hemisphere	FA	0.014999	0.009808	[-0.0042, 0.0342]	0.936889	0.031576	29.8	0.441412	[-0.0041, 0.0339]
		MD	-0.01499	0.026146	[-0.0662, 0.0363]	0.283219	0.030816	25.91	-0.16544	[-0.0656, 0.0364]
		AD	-0.00463	0.013334	[-0.0308, 0.0215]	0.364243	0.014162	51.98	-0.1002	[-0.0305, 0.0212]
		RD	0.000926	0.009491	[-0.0177, 0.0195]	0.538856	0.009536	70.47	0.02816	[-0.0177, 0.0196]
MCP	Right Hemisphere	FA	0.010833	0.006331	[-0.0016, 0.0232]	0.956457	0.027364	45.88	0.493907	[-0.0017, 0.0231]
		MD	0.000833	0.001486	[-0.0021, 0.0037]	0.712469	0.001739	100	0.161834	[-0.0021, 0.0037]
		AD	-0.00045	0.005853	[-0.0119, 0.0110]	0.469052	0.005871	91.29	-0.02242	[-0.0118, 0.0110]
		RD	0.010038	0.005505	[-0.0008, 0.0208]	0.965879	0.029021	48.96	0.526362	[-0.0005, 0.0209]

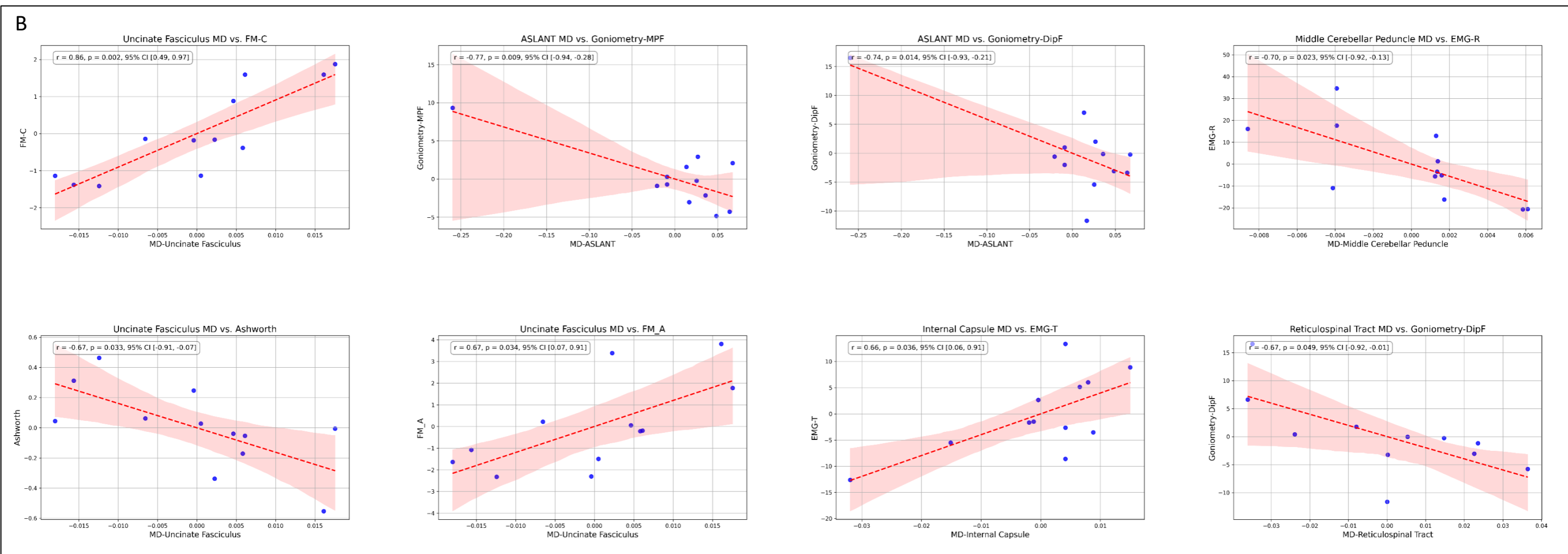
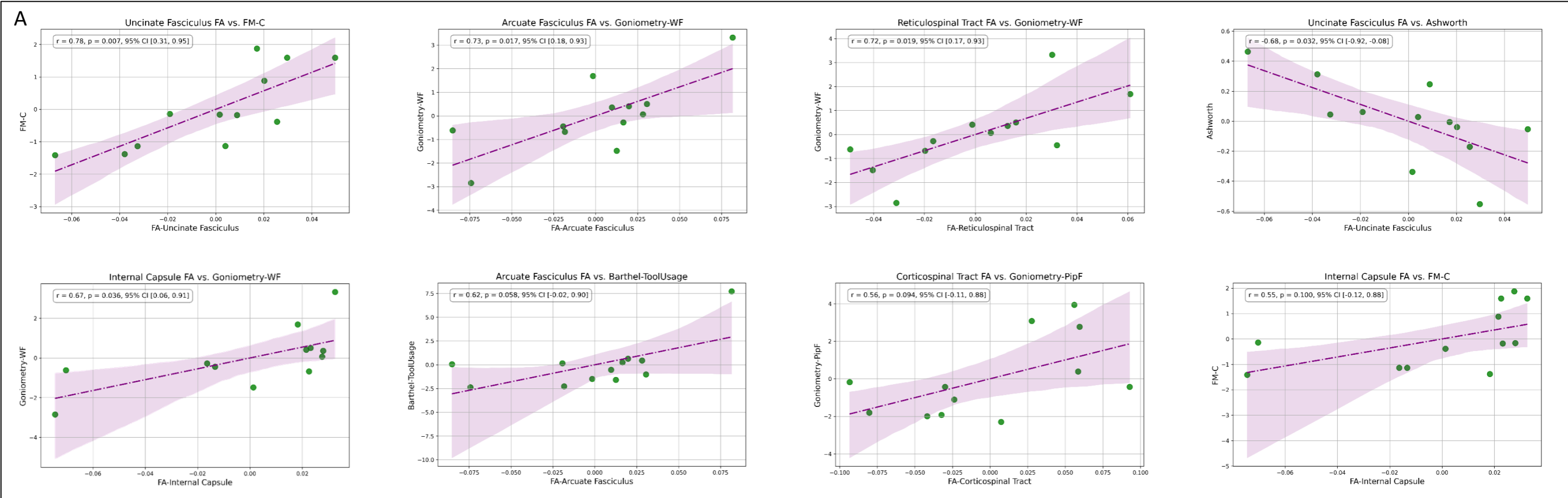
Appendix 6. Statistical Analysis of Diffusion Tensor Imaging (DTI) Scalars in Relation to Functional and Clinical Measures Across White Matter Tracts

Side	DTI Scalars	Tracts	Statistics			
			Dep.Var.	Coef.	STD. E.	P> z
Right	Fractional Anisotropy	Uncinate Fasciculus	FM-C	0.007	0.784	0.31 - 0.95
		Arcuate Fasciculus	Goniometry-WF	0.016	0.728	0.18 - 0.93
		Reticulospinal Tract	Goniometry-WF	0.018	0.720	0.17 - 0.93
		Uncinate Fasciculus	Ashworth	0.031	-0.676	-0.92 - -0.08
	Mean Diffusivity	Internal Capsule	Goniometry-WF	0.035	0.665	0.06 - 0.91
		Arcuate Fasciculus	Barthel-ToolUsage	0.058	0.615	-0.02 - 0.9
		Corticospinal Tract	Goniometry-PipF	0.094	0.556	-0.11 - 0.88
		Internal Capsule	FM-C	0.10	0.548	-0.12 - 0.88
	Axial diffusivity	Uncinate Fasciculus	FM-C	0.052	0.855	0.49 - 0.97
		ASLANT	Goniometry-MPF	0.043	-0.774	-0.94 - -0.28
		ASLANT	Goniometry-DipF	0.023	-0.740	-0.93 - -0.21
		Middle Cerebellar Peduncle	EMG-R	0.032	-0.703	-0.92 - -0.13
	radial diffusivity	Uncinate Fasciculus	Ashworth	0.047	-0.671	-0.91 - -0.07
		Uncinate Fasciculus	FM_A	0.045	0.6694	0.07 - 0.91
		Internal Capsule	EMG-T	0.056	0.6647	0.06 - 0.91
		Reticulospinal Tract	Goniometry-DipF	0.049	-0.669	-0.92 - -0.01
Left	Fractional Anisotropy	Corticospinal Tract	Goniometry-WF	0.042	0.784	0.31 - 0.95
		Arcuate Fasciculus	Barthel-ToolUsage	0.035	0.728	0.18 - 0.93
		Reticulospinal Tract	Goniometry-PipF	0.043	0.720	0.17 - 0.93
		Corticospinal Tract	FM-C	0.052	-0.676	-0.92 - -0.08
	Mean Diffusivity	Internal Capsule	FM-C	0.054	0.665	0.06 - 0.91
		Arcuate Fasciculus	Goniometry-MPF	0.065	0.615	-0.02 - 0.9
		Corticospinal Tract	Goniometry-WF	0.102	0.556	-0.11 - 0.88
		Internal Capsule	Barthel-ToolUsage	0.116	0.548	-0.12 - 0.88
	Axial diffusivity	Corticospinal Tract	Goniometry-PipF	0.054	0.855	0.49 - 0.97
		Reticulospinal Tract	Ashworth	0.044	-0.774	-0.94 - -0.28
		Arcuate Fasciculus	FM_A	0.055	-0.740	-0.93 - -0.21
		Middle Cerebellar Peduncle	EMG-T	0.056	-0.703	-0.92 - -0.13
	radial diffusivity	Internal Capsule	Goniometry-DipF	0.051	-0.671	-0.91 - -0.07
		Reticulospinal Tract	Ashworth	0.052	0.6694	0.07 - 0.91
		Internal Capsule	Goniometry-WF	0.043	0.6647	0.06 - 0.91
		Reticulospinal Tract	Barthel-ToolUsage	0.054	-0.669	-0.92 - -0.01



Appendix 7. Linear Mixed Effect Regression Model Analysis Across Various Tracts and Metrics.

This figure presents the results of a Linear Mixed Effect Regression Model applied to different dependent variables across multiple white matter tracts. The dependent variables include Mean Diffusivity (MD), Axial Diffusivity (AD), and Radial Diffusivity (RD) measured in various regions: the Middle Cerebellar Peduncle, Uncinate Fasciculus, Internal Capsule, Arcuate Fasciculus, ASLANT, and the Corticospinal Tract. Each subplot displays the regression lines with confidence intervals, showing the relationship between the dependent variable and the respective white matter tract. The plots demonstrate how diffusivity metrics vary across different brain regions, with some tracts showing significant changes over time or in response to the analyzed factors. Notably, the results highlight specific trends such as the decrease in MD and RD in the Middle Cerebellar Peduncle and Uncinate Fasciculus, indicating potential microstructural changes in these areas. Conversely, other tracts like the Arcuate Fasciculus and ASLANT exhibit varied patterns, suggesting differential impacts of the analyzed factors on white matter integrity. The figure provides a comprehensive view of how the selected white matter tracts are affected, offering insights into the microstructural alterations occurring in these regions under different conditions.



Appendix 8. Correlation Analysis Between Diffusion Metrics and Functional/Clinical Measures

Panel A displays the correlation between Fractional Anisotropy (FA) values and various functional and clinical measures across different white matter tracts. Significant correlations are observed, such as between the Uncinate Fasciculus FA and FMA-C ($r = 0.76$, $p = 0.001$), and the Reticulospinal Tract FA with Goniometry-WF ($r = 0.79$, $p < 0.001$). Other notable relationships include a negative correlation between Uncinate Fasciculus FA and Ashworth Scale ($r = -0.74$, $p = 0.002$), indicating a potential link between white matter integrity and muscle spasticity. **Panel B** illustrates the correlation between Mean Diffusivity (MD) values and various functional and clinical measures. Strong correlations are observed, including a positive correlation between Uncinate Fasciculus MD and FMA-C ($r = 0.78$, $p < 0.001$), and a negative correlation between ASLANT MD and Goniometry-MPF ($r = -0.75$, $p < 0.001$). These results suggest that changes in MD may be associated with both improvements and deteriorations in motor function, depending on the tract and measure involved. The regression lines with confidence intervals highlight the strength and direction of these relationships, emphasizing the relevance of diffusion metrics as potential biomarkers for functional outcomes in neurorehabilitation.