

Table 1. Participant Characteristics

	Healthy Controls		All PwMS		EDSS 0-1		EDSS 1.5-2.0		EDSS 2.5-4.0	
	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD
Age	44.3	11.1	43.1	10.4	37.0	8.7	40.8	9.7	49.6	8.5
Sex (% male)	30%		30%		50%		17%		29%	
Height (cm)	171.5	8.7	170.7	9.7	173.4	10.7	170.3	8.6	168.6	9.3
Body Mass Index (kg/m ²)	24.0	4.3	27.6	5.0	26.5	6.7	27.2	3.9	28.7	3.9
Weekly exercise frequency	3.4	1.2	2.5	1.5	2.3	1.6	2.9	1.5	2.3	1.6
Timed 25-foot walk (sec)	4.5	0.6	5.3	0.8	4.8	0.9	5.3	0.6	5.6	0.8
Average Gait Speed over 5 min (m/s)	1.5	0.2	1.2	0.2	1.4	0.2	1.3	0.2	1.2	0.2

Abbreviations: PwMS, people with multiple sclerosis; EDSS extended disability status scale; SD, standard deviation

Table 2. Clinical Characteristics of Disability Groups

EDSS subgroups	All PwMS		EDSS 0-1		EDSS 1.5-2.0		EDSS 2.5-4	
	n=51 (100%)		n=18 (35.3%)		n=12 (23.5%)		n=21 (41.2%)	
	mean	SD	mean	SD	mean	SD	mean	SD
Total EDSS	1.9	1.2	0.6	0.5	1.8	0.2	3.0	0.6
Pyramidal	0.9	0.9	0.3	0.5	1.0	0.6	1.4	1.0
Cerebellar	0.7	0.9	0.2	0.4	0.9	0.8	1.0	1.0
Brainstem	0.3	0.6	0.1	0.2	0.2	0.4	0.6	0.9
Sensory	0.6	0.9	0.1	0.2	0.3	0.7	1.2	1.0
Bowel/Bladder	0.6	0.9	0.0	0.0	0.4	0.5	1.2	1.1
Visual	0.0	0.2	0.0	0.0	0.2	0.4	0.0	0.0
Mental	0.3	0.6	0.1	0.2	0.3	0.7	0.5	0.8
Years Since Diagnosis	5.8	3.9	5.0	3.5	4.1	2.9	7.6	4.1
Fatigue Today (1-10 scale)	2.8	2.7	1.2	2.1	4.0	2.4	3.5	2.7

Values are mean (*standard deviation*) or percentage.

Abbreviations: PwMS, people with multiple sclerosis; EDSS, extended disability status scale; SD, standard deviation.

Table 3 - Between-Groups Effects – All Groups (MANOVA)

Sensor Location	Plane	df	Statistic	No covariate			Controlling for gait speed		
				F [#] /H	p	η ²	F	p	η ²
Sacrum	3D	3	F	3.406	.022	.127	3.51	0.02	0.132
	Mediolateral	3	F	2.897	.041	.11	2.695	0.053	0.105
	Anteroposterior	3	F	1.592	.199	.064	1.587	0.200	0.065
	Vertical	3	H	9.942	.019 [^]	.129	2.885	0.042	0.111
Sternum	3D	3	F	7.555	.000	.245	3.884	0.013	0.144
	Mediolateral	3	F	8.818	.000	.274	2.293	0.086	0.091
	Anteroposterior	3	H	18.104	.000 [^]	.24	2.998	0.037	0.115
	Vertical	3	H	11.599	.009 [^]	.17	4.045	0.010	0.150
Clinical Tests	Timed 25 ft walk Average Gait Speed over 5 min (m/s)	No covariate							
		3	F	10.229	<.001	.308			
		3	F	10.460	<.001	.313			

*transformed variable

[^] Bonferroni correction for multiple comparisons requires p<0.0083

Tukey adjusted

Table 4 - Between-Group Effects - Healthy Controls versus non-disabled PwMS (EDSS 0-1)

TABLE 1. Between-Group Effects: Healthy Controls Versus Non-Diseased (N = 27)								
MANOVA		No covariate			Controlling for gait speed			
Sensor Location	Plane	F	p	η^2	F	p	η^2	
Sacrum	3D	4.772	.035	.109	5.895	0.02	0.134	
	Mediolateral	0.844	.364	.021	1.138	0.293	0.029	
	Anteroposterior	3.000	.091	.071	4.213	0.047	0.100	
	Vertical	6.078	.018	.141	3.679	0.063	0.088	
Sternum	3D	11.846	.001	.233	10.5	0.002	0.216	
	Mediolateral	6.695	.014	.147	2.432	0.127	0.060	
	Anteroposterior	6.586	.014	.152	5.573	0.023	0.128	
	Vertical	10.559	.002	.219	13.277	0.001	0.259	
		No covariate						
Clinical Tests	Timed 25 ft walk	2.487	.123	.061				
	Average Gait Speed over 5 min (m/s)	5.390	.026	.124				

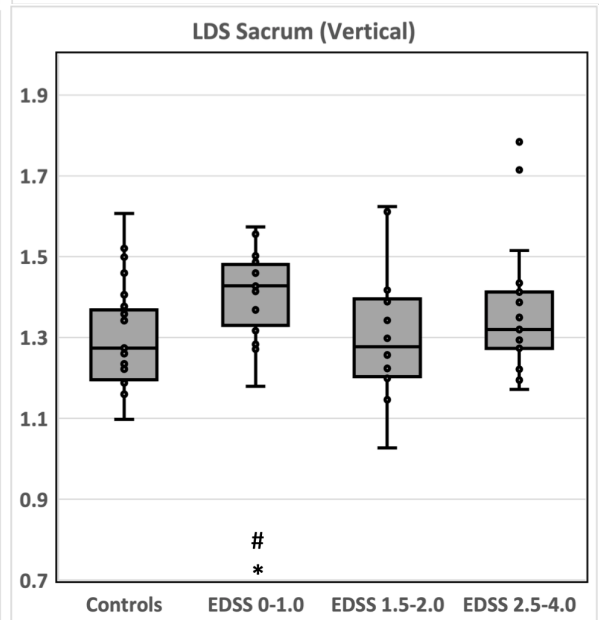
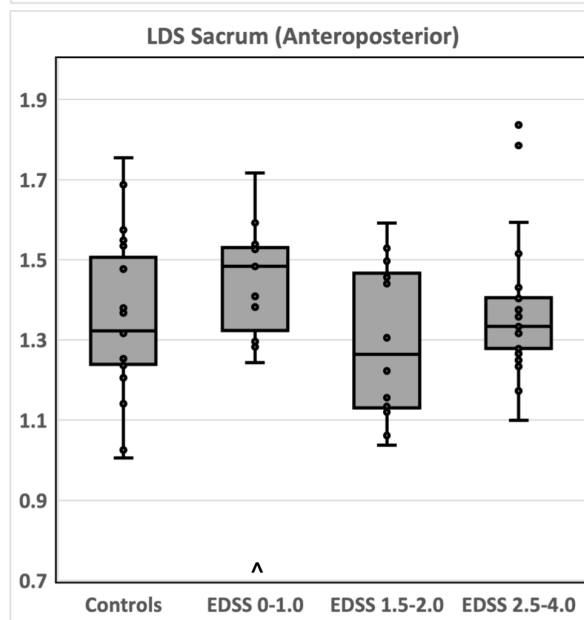
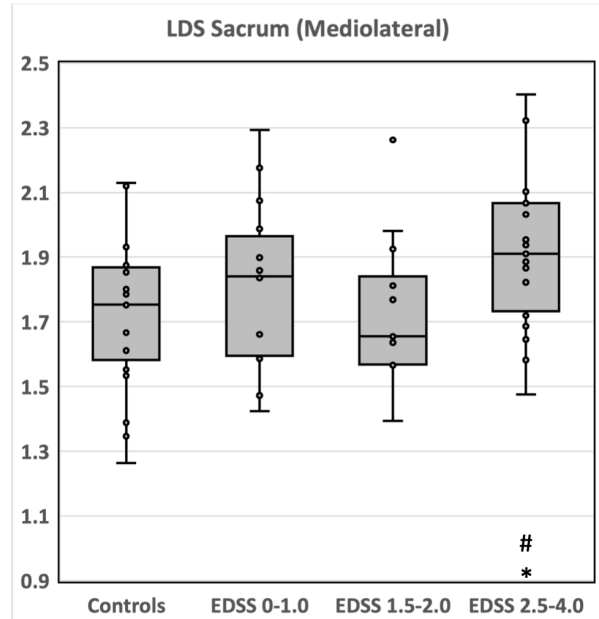
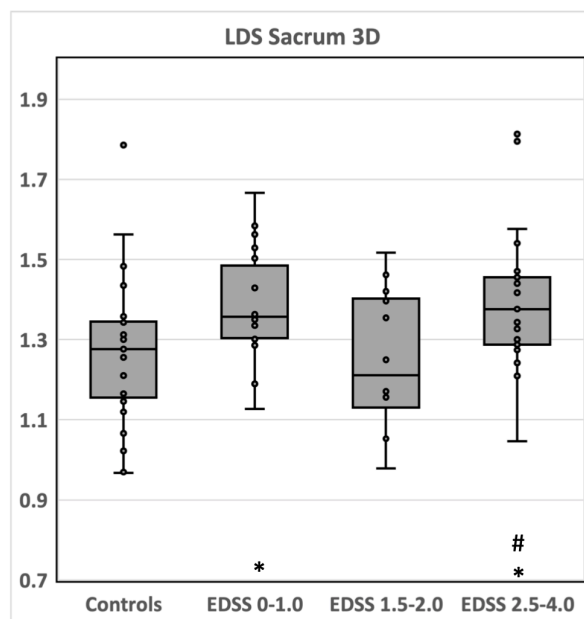
Table 5 - Area under the ROC Curve

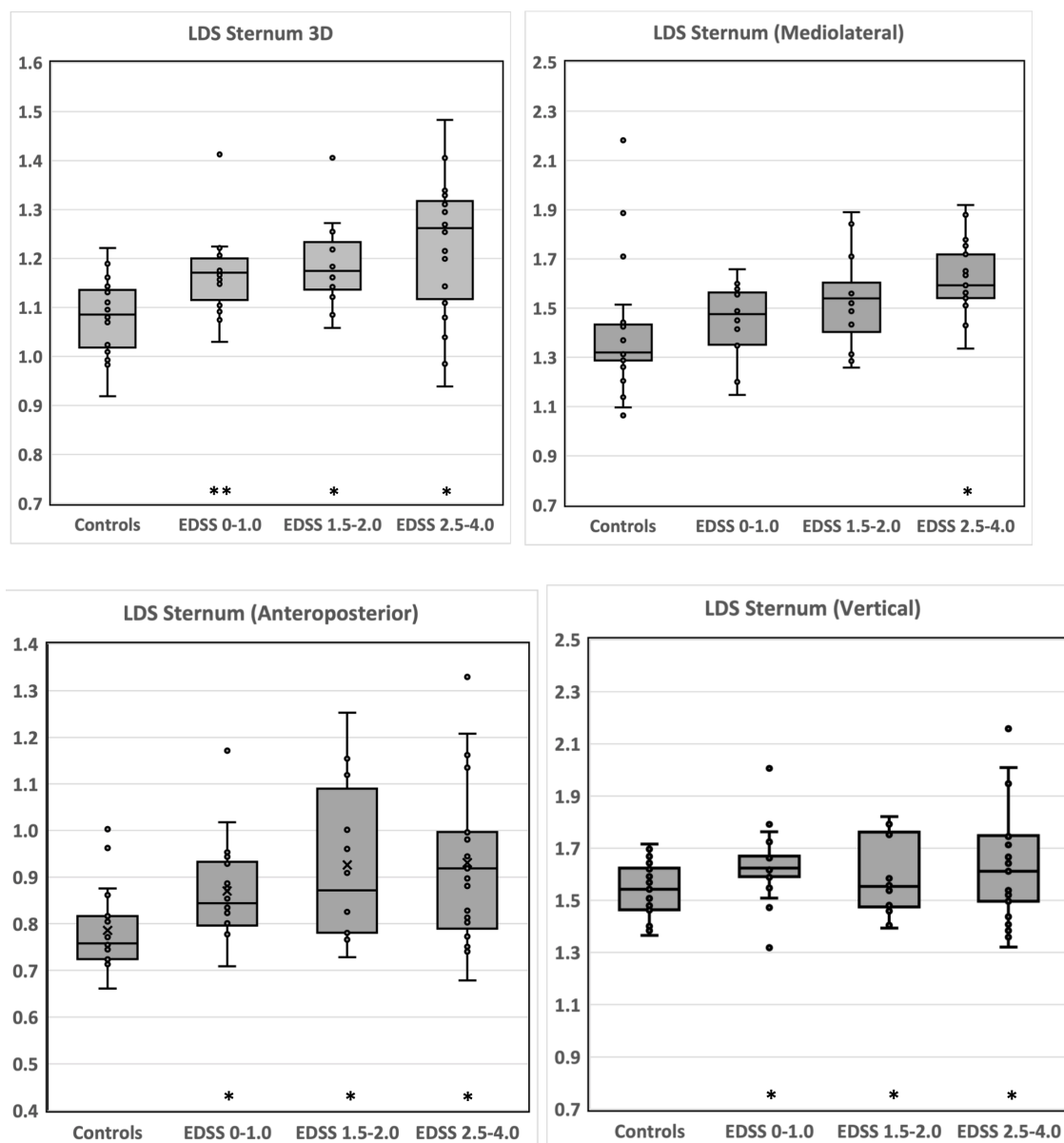
Sensor Location	Plane	Detecting any PwMS (EDSS 0-4) from Healthy Controls					Detecting Non-disabled PwMS (EDSS 0-1) from Healthy Controls				
		95% Confidence Interval					95% Confidence Interval				
		AUC	Standard Error	p	Lower Bound	Upper Bound	AUC	Standard Error	p	Lower Bound	Upper Bound
Sacrum	3D	.659	.069	.029	.523	.795	.727	.079	.014	.571	.883
	Mediolateral	.609	.070	.136	.471	.746	.556	.093	.546	.374	.737
	Anteroposterior	.556	.074	.444	.411	.701	.659	.087	.083	.489	.830
	Vertical	.658	.076	.030	.510	.806	.744	.079	.008	.588	.900
Sternum	3D	.801	.051	< .000	.702	.901	.795	.071	.001	.656	.933
	Mediolateral	.803	.062	< .000	.681	.925	.742	.080	.009	.584	.899
	Anteroposterior	.792	.057	< .000	.680	.904	.761	.079	.005	.606	.916
	Vertical	.748	.060	.001	.629	.866	.751	.076	.006	.603	.900
Clinical Tests	Timed 25 ft walk	0.792	0.054	< .000	0.687	0.897	0.618	0.095	0.208	0.432	0.804
	Mean Gait Speed	0.162	0.049	< .000	0.066	0.259	0.248	0.082	0.007	0.088	0.408

AUC = Area under the curve

Table 6 - Spearman's Correlations

		EDSS	Kurtzke Functional System Score						
		total	pyramidal	cerebellar	brainstem	sensory	bowel & bladder	visual	mental
		r	r	r	r	r	r	r	r
		(p)	(p)	(p)	(p)	(p)	(p)	(p)	(p)
Clinical Tests	Timed 25 ft walk	.486** (<i>< .001</i>)	.348* (<i>0.013</i>)	.475** (<i>< .001</i>)	0.029 (<i>0.839</i>)	.357* (<i>0.011</i>)	0.042 (<i>0.773</i>)	0.134 (<i>0.352</i>)	0.087 (<i>0.548</i>)
	Mean Gait Speed	-.459** (<i>0.001</i>)	-.427** (<i>0.002</i>)	-.391** (<i>0.005</i>)	0.08 (<i>0.577</i>)	-.324* (<i>0.02</i>)	-0.065 (<i>0.651</i>)	-0.065 (<i>0.649</i>)	-0.083 (<i>0.565</i>)
Sacrum Sensor	3D	.099 (<i>.489</i>)	.138 (<i>.335</i>)	-.130 (<i>.365</i>)	.198 (<i>.165</i>)	.198 (<i>.163</i>)	-.112 (<i>.435</i>)	-.055 (<i>.702</i>)	.012 (<i>.931</i>)
		.280* (<i>.046</i>)	.137 (<i>.337</i>)	-.074 (<i>.606</i>)	.241 (<i>.089</i>)	.362** (<i>.009</i>)	-.008 (<i>.954</i>)	-.075 (<i>.599</i>)	.216 (<i>.129</i>)
	Anteroposterior	-.083 (<i>.561</i>)	.131 (<i>.358</i>)	-.074 (<i>.605</i>)	.085 (<i>.554</i>)	.089 (<i>.534</i>)	-.222 (<i>.117</i>)	-.089 (<i>.534</i>)	.029 (<i>.843</i>)
	Vertical	.084 (<i>.559</i>)	.157 (<i>.272</i>)	.043 (<i>.766</i>)	-.046 (<i>.748</i>)	.061 (<i>.672</i>)	-.051 (<i>.722</i>)	-.082 (<i>.566</i>)	.059 (<i>.68</i>)
	3D Sensor	.330* (<i>.018</i>)	.447** (<i>.001</i>)	.139 (<i>.330</i>)	.142 (<i>.320</i>)	.248 (<i>.079</i>)	.036 (<i>.802</i>)	-.130 (<i>.362</i>)	.027 (<i>.851</i>)
		.360** (<i>.010</i>)	.397** (<i>.004</i>)	.061 (<i>.671</i>)	.125 (<i>.381</i>)	.293* (<i>.037</i>)	.004 (<i>.980</i>)	.021 (<i>.886</i>)	.116 (<i>.418</i>)
		.304* (<i>.030</i>)	.281* (<i>.046</i>)	.175 (<i>.219</i>)	.219 (<i>.123</i>)	.270 (<i>.055</i>)	-.106 (<i>.459</i>)	.014 (<i>.924</i>)	-.046 (<i>.750</i>)
		.104 (<i>.468</i>)	.254 (<i>.072</i>)	.001 (<i>.997</i>)	.115 (<i>.421</i>)	.128 (<i>.371</i>)	.016 (<i>.912</i>)	-.048 (<i>.738</i>)	.058 (<i>.688</i>)





Figures 1 a-h. Box plots for each LDS variable by disability group; a) Sacrum_{3D}, b) Sacrum_{ML}, c) Sacrum_{AP}, d) Sacrum_{VT}, e) Sternum_{3D}, f) Sternum_{ML}, g) Sternum_{AP}, h) Sternum_{VT}.

. * significantly different from Health Controls ($p < .05$), # significantly different from EDSS 1.5-2 ($p < .05$), ^ significantly different from Health Controls when controlling for gait speed ($p < .05$)