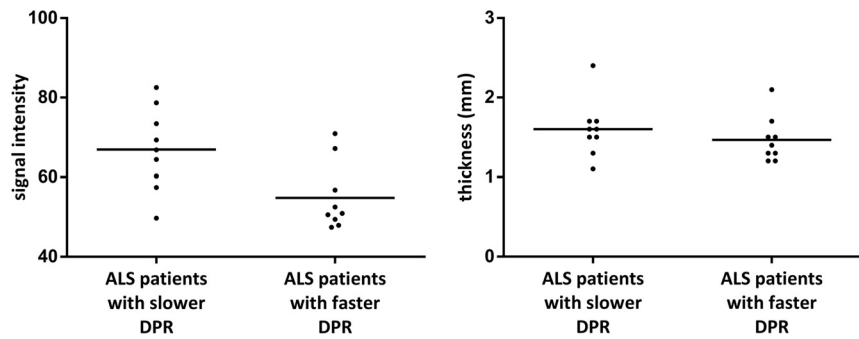


**ON-LINE FIG 1.** Scatterplot of UMN scores in correctly diagnosed and misdiagnosed patients with ALS derived from readers 1 (A) and 2 (B). Cortical thickness (C) and signal intensity (D) in the deeper layers of the M1 in patients with ALS and HS.



**ON-LINE FIG 2.** Signal intensity and cortical thickness of the deeper layers of the M1 in patients with slower and faster disease progression rate.

**On-line Table 1: Clinical and demographic data of patients with ALS**

Patient No.	Sex	Family History	Onset	Age at Onset (yr)	DD (mo)	ALSFRS-R at Time of MRI		UMN Score at Time of MRI (0–33)	Bulbar UMN Score (0–1)	UMN Score of Right Upper Limb (0–8)		UMN Score of Left Upper Limb (0–8)		UMN Score of Right Lower Limb (0–8)	UMN Score of Left Lower Limb (0–8)	DPR
						MRI (0–48)	MRI (0–41)			Right	Left	Right	Left			
1	M	Negative	Lower limbs	63	18	41	41	0	0	0	0	0	0	0	0	0.39
2	F	Negative	Lower limbs	62	8	41	41	1	0	0	0	0	0	0	1	0.88
3	M	Negative	Lower limbs	65	44	35	68	8	0	3	3	3	1	1	1	0.30
4	M	Negative	Lower limbs	67	12	42	42	2	0	0	0	0	1	1	1	0.50
5	M	Negative	Lower limbs	48	16	43	43	4	0	0	0	0	2	2	2	0.31
6	M	Negative	Lower limbs	65	18	35	35	19	0	3	2	7	7	7	7	0.72
7	M	Negative	Lower limbs	41	8	42	42	15	0	0	0	3	5	5	7	0.75
8	F	Positive	Lower limbs	55	26	36	24	24	0	6	6	6	6	6	6	0.46
9	F	Negative	Upper limbs	62	10	33	25	25	1	6	6	6	6	6	6	1.50
10	M	Negative	Upper limbs	66	10	41	41	0	0	0	0	0	0	0	0	0.70
11	M	Negative	Upper limbs	46	16	23	23	23	0	4	4	4	8	7	7	1.56
12	F	Negative	Upper limbs	63	46	38	38	2	0	0	0	0	1	1	1	0.22
13	M	Negative	Lower limbs	69	31	41	41	10	0	3	3	3	2	2	2	0.23
14	M	Negative	Upper limbs	84	5	41	25	25	1	7	7	5	5	5	5	1.40
15	M	Negative	Upper limbs	48	17	43	43	2	0	0	0	1	0	1	1	0.29
16	M	Negative	Lower limbs	56	14	43	43	0	0	0	0	0	0	0	0	0.36
17	M	Negative	Upper limbs	62	10	45	45	1	0	1	1	0	0	0	0	0.30
18	M	Negative	Upper limbs	65	5	45	45	0	0	0	0	0	0	0	0	0.60
19	F	Negative	Lower limbs	58	12	40	40	5	0	1	1	0	2	2	2	0.67
20	M	Negative	Upper limbs	52	15	46	46	0	0	0	0	0	0	0	0	0.13
21	M	Negative	Lower limbs	69	8	38	38	24	0	6	6	6	7	5	5	1.25
22	M	Negative	Lower limbs	54	13	44	44	0	0	0	0	0	0	0	0	0.31

**Note:**—DD indicates disease duration.

**On-line Table 2: Scale for clinical evaluation of upper motor neuron impairment<sup>a</sup>**

Scale
Bulbar
Pseudobulbar affect (0 = absent; 1 = present)
Upper limbs
Spasticity (0–2) <sup>b</sup>
Triceps reflex (0–2) <sup>c</sup>
Biceps reflex (0–2) <sup>c</sup>
Brachioradialis reflex (0–2) <sup>c</sup>
Lower limbs
Spasticity (0–2) <sup>b</sup>
Patellar reflex (0–2) <sup>c</sup>
Ankle reflex (0–2) <sup>c</sup>
Clonus (0–1) <sup>d</sup>
Babinski sign (0–1) <sup>d</sup>
Maximum overall range 0–33

<sup>a</sup>To obtain a parametric scale of UMN involvement, a composite score of upper motor neuron “burden” was calculated, by totalling the number of pathologic UMN signs on examination.<sup>8,22</sup> The scale considers, bilaterally, biceps, triceps, brachioradialis, patellar and ankle reflexes, extensor plantar responses, clonus presence, pseudobulbar signs, and spasticity (assessed by a scoring based on the Ashworth spasticity scale<sup>23</sup>).

<sup>b</sup>Spasticity scoring: Ashworth 1 = 0; Ashworth 2–3 = 1; Ashworth 4–5 = 2.

<sup>c</sup>Reflex scoring: normal or absent = 0; slightly pathologically brisk = 1; retained reflex in a weak or wasted limb = 1; polykinetic = 2.

<sup>d</sup>Clonus and Babinski sign: 0 = absent; 1 = present.

**On-line Table 3: Summary of the results: UMN score and DPR in correctly diagnosed and misdiagnosed patients with ALS<sup>a</sup>**

	Correctly Diagnosed Patients	Misdiagnosed Patients	P Value <sup>b</sup>
UMN score			
First reader	13 ± 10 (0–25)	1 ± 1 (0–2)	.003
Second reader	14 ± 10 (0–25)	4 ± 8 (0–24)	.028
DPR			
First reader	0.85 ± 0.48 (0.23–1.56)	0.33 ± 0.20 (0.13–0.70)	.019
Second reader	0.87 ± 0.49 (0.30–1.56)	0.48 ± 0.38 (0.13–1.25)	.066

<sup>a</sup>Results are reported as mean value ± SD (range).

<sup>b</sup>Mann-Whitney *U* test.

**On-line Table 4: Cortical thickness and signal intensity of deep layers of M1 in patients with ALS and healthy subjects<sup>a</sup>**

	Patients with ALS	Healthy Subjects	P Value <sup>b</sup>
Cortical thickness (mm)	1.5 ± 0.3 (1.1–2.4)	2.0 ± 0.4 (1.6–2.8)	<.001
Signal intensity	60.9 ± 11.1 (47.4–82.5)	64.8 ± 6.0 (55.1–76.7)	.262

<sup>a</sup>Results are reported as mean value ± SD (range).

<sup>b</sup>Mann-Whitney *U* test.

**On-line Table 5: Correlations of morphometric parameters with clinical scores<sup>a</sup>**

	UMN Score	DPR	ALSFRS-R
Cortical thickness (mm)	$r = -0.59, P \text{ value} < .001$	$r = -0.47, P \text{ value} = .051$	$r = 0.49, P \text{ value} = .039$
Signal intensity	$r = -0.47, P \text{ value} < .001$	$r = -0.60, P \text{ value} = .009$	$r = 0.45, P \text{ value} = .061$

<sup>a</sup>Spearman correlation.

**On-line Table 6: Distribution of morphometric parameters among subgroups of patients with slower and faster DPR<sup>a</sup>**

	Patients with Slower DPR	Patients with Faster DPR	P Value <sup>b</sup>
Cortical thickness (mm)	1.6 ± 0.3 (1.1–2.4)	1.5 ± 0.3 (1.2–2.1)	.285
Signal intensity	67.0 ± 10.4 (49.7–82.5)	54.9 ± 8.6 (47.4–70.9)	.024

<sup>a</sup>Results are reported as mean value ± SD (range).

<sup>b</sup>Mann-Whitney *U* test.