

Use of the Adult Myopathy Assessment Tool (AMAT) as a Predictor of Functional Abilities in People with Multiple Sclerosis.

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BACKGROUND

People with multiple sclerosis (PwMS) are at greater risk for decreased muscle performance which may lead to decreased functional abilities. The Kurtzke Expanded Disability Status Scale (EDSS) is commonly used as a disability status rating scale in PwMS. Nevertheless, the EDSS is largely comprised of neurological tests and may not best reflect functional performance.

PURPOSE: To determine the comparative association of the AMAT and EDSS with measures of strength, fatigability, and functional performance.

HYPOTHESIS: A functional battery such as The Adult Myopathy Assessment Tool (AMAT) may better reflect functional performance. The AMAT was designed to assess both functional strength and endurance in clinical settings. However, the AMAT has not been validated for the assessment of PwMS.

Table 1. Sample Demographics

Subjects with MS n = 29	
Age (years)	48.6 (±11.15; 31-71)
Female (%)	52%
Race (%): Caucasian African-American	79.3% 20.7%
MS Type (%): Relapse-Remitting Secondary Progressive	72.4% 27.6%
EDSS	3.6 (±1.4; 1.5-6)
Disease Duration (years)	13.3 (±10.4; 0.5-38)
BMI	27.2 (±4.9; 19.7-37.1)

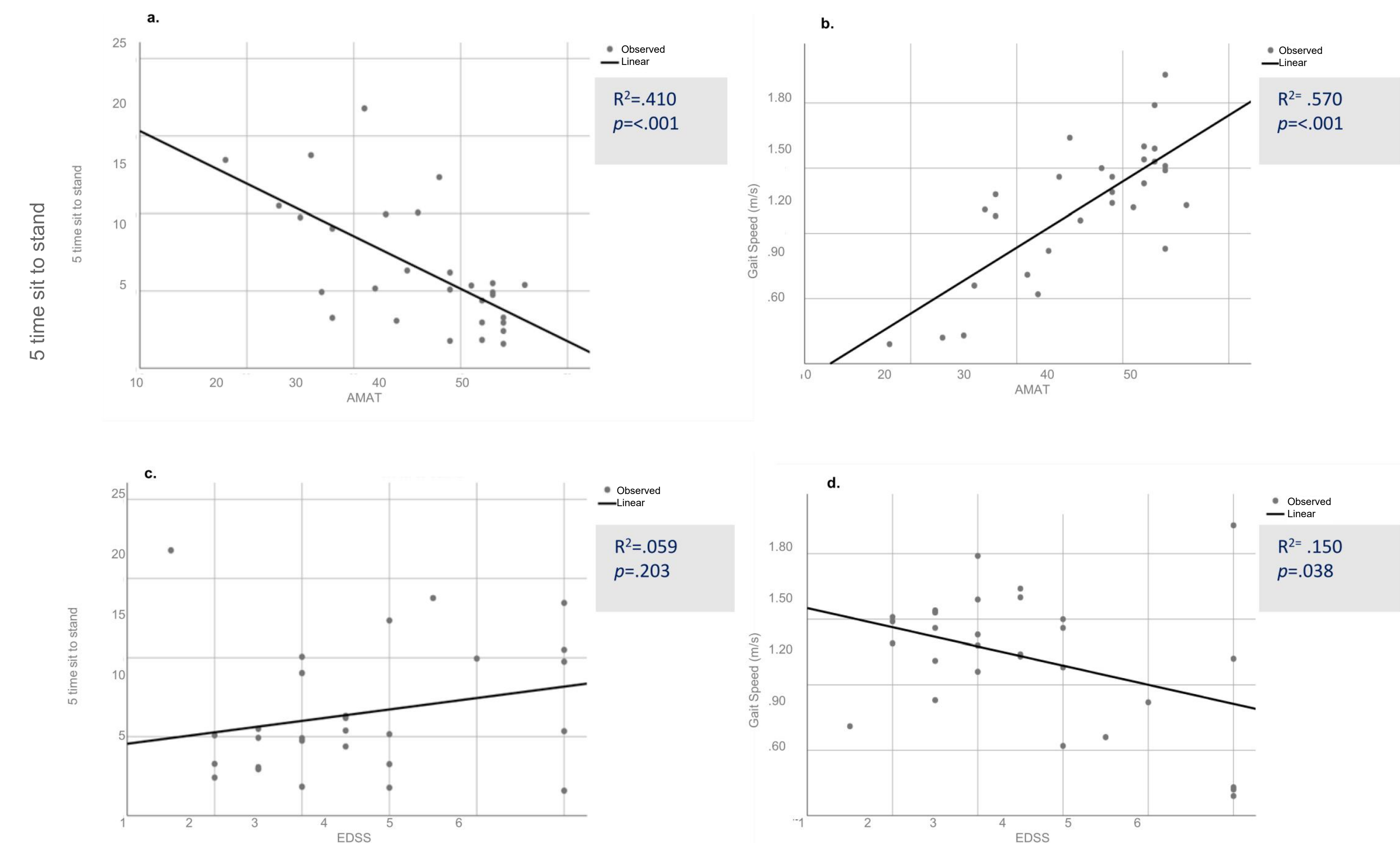
Data presented as mean, standard deviation (SD), range. EDSS=Expanded Disability Status Scale, BMI= body mass index, AMAT=Adult Myopathy Assessment Tool

Table 2. Function and Muscle Performance

Subjects with MS n = 29	
AMAT (Total) AMAT (Function) AMAT (Endurance)	36.1(±7.6;18-45) 18.2 (±3.3; 8-21) 17.9 (±5.3; 8-24)
Gait Speed (m/s)	1.30 (±0.30;0.69-1.93)
5 time sit to stand (sec)	11.4 (±4.1; 6.6-21.8)
Peak Force (Kg)	70.1 (±22.0; 30.7-101.9)
Scaled Peak Force (Kg/BMI)	0.39 (±0.10;.20-.60)
Exhaustion Time (sec)	38.4 (±17.4;10.8-60.0)

RESULTS

Figure 2 a-d: Association of Functional Tasks to AMAT and EDSS



METHODS

Procedures: Individuals were recruited from the Washington DC VA Medical Center and MS Center of Excellence – EAST (Table 1)

Participants completed functional testing (5 times sit to stand and gait speed) and an assessment of disability and functional status using the EDSS and AMAT, respectively.

60-second maximal volitional isometric contraction (MVIC) quadricep fatigue test, with the less affected leg, was used to calculate fatigability (exhaustion time to 60% of MVIC).

Data Analysis: Descriptive statistics and correlation coefficients (Spearman's) were used to examine relationships of strength and endurance measures with the EDSS and the AMAT. Furthermore, multiple regression modeling examined the AMAT and EDSS association with function. A two-tailed test with alpha at .05 was conducted to designate significant findings.

Figure 1 a and b: AMAT and Isometric testing.

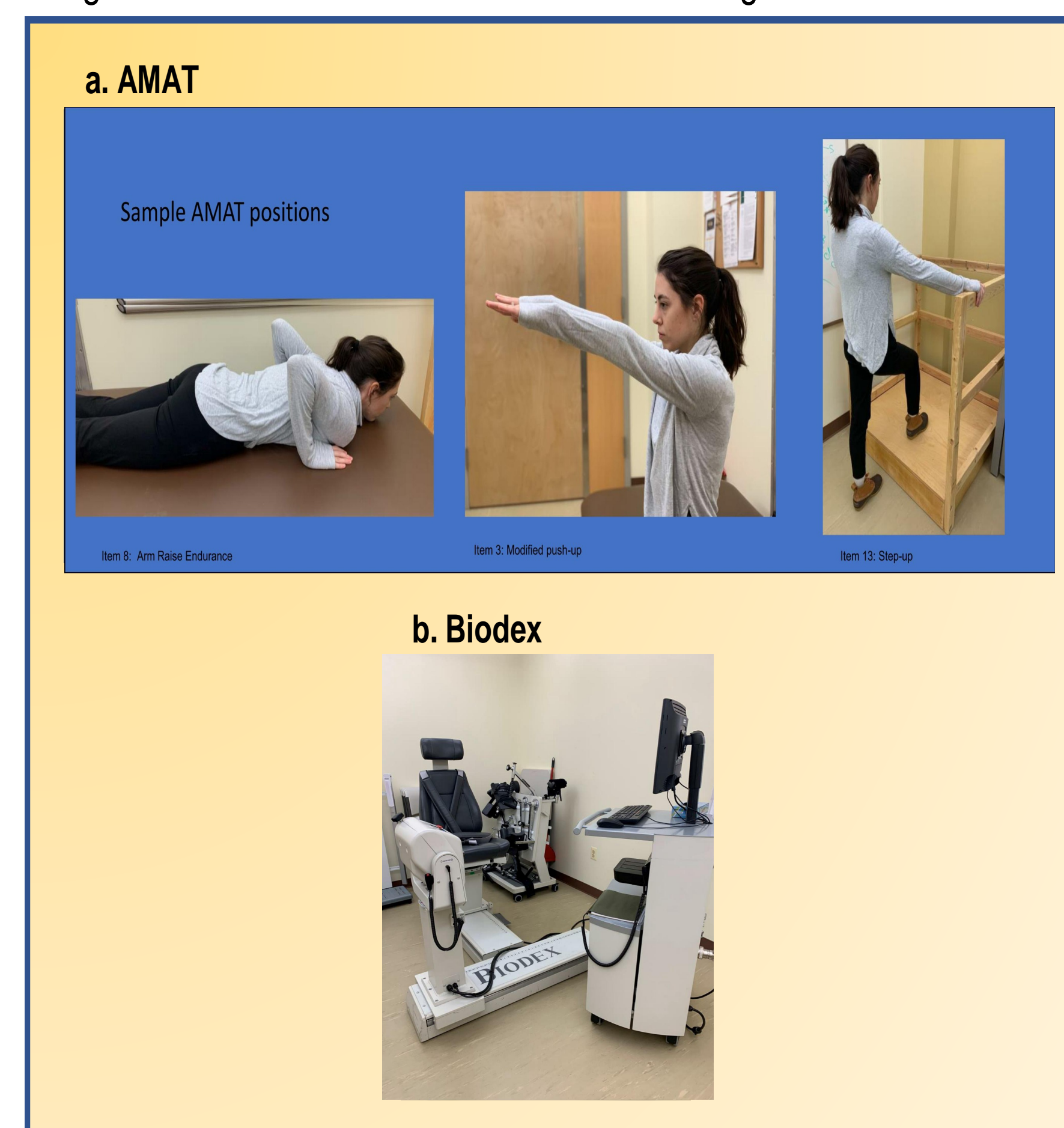


Table 3. EDSS and AMAT Correlation with Force and Fatigability

MEASURE		r	P value
Peak Force	EDSS	-.423*	.022
	AMAT (total)	.251	.189
	AMAT (function)	.295	.121
Scaled Peak Force	EDSS	-.259	.174
	AMAT (total)	.316	.094
	AMAT (function)	.426*	.021
Exhaustion Time	EDSS	-.524*	.004
	AMAT (total)	.318	.093
	AMAT (function)	.352	.061
AMAT (endurance)	.246	.199	

T= AMAT total, F=AMAT function E=AMAT endurance

DISCUSSION and CLINICAL RELEVANCE

- The AMAT was more strongly correlated with scaled peak force and associated with functional measures in comparison to the EDSS.
- EDSS was most strongly correlated with exhaustion time. This may be due to the test design which captures disease status better than function. We found only a weak negative associations between EDSS and Gait Speed and no association between EDSS and 5 time sit to stand times.
- We suggest clinicians administer the AMAT, a functional battery, in addition to the EDSS, to gain insight into functional impairments and assist with formulating a comprehensive plan of care.