

Clinical Case Study: Just Walk Protocol in Secondary Progressive Multiple Sclerosis

Patient: Leann (Female, Age 44)

Intervention Period: June – September 2026 (15 Weeks)

Primary Diagnosis: Secondary Progressive Multiple Sclerosis (SPMS, diagnosed 2001)

1. Patient Background & Clinical History

Leann is a 44-year-old female diagnosed with Multiple Sclerosis (MS) in 2001, which has since progressed to Secondary Progressive Multiple Sclerosis (SPMS). Her clinical course is characterized by spasticity and fluctuating mobility limitations. She has a history of a significant relapse in 2019 and has undergone multiple disease-modifying therapies (DMTs), including Tysabri, Ocrevus, and Mazin, as well as investigational stem cell and plasma exchange trials, none of which yielded notable functional improvement. Additionally, conservative spasticity management through Baclofen and Botox has proven unsuccessful.

Due to progressive mobility impairment and reduced upper-extremity/hand dexterity, Leann is currently on long-term disability from her profession as an X-ray technician.

Prior Rehabilitation & Assistive Technology Trials

Standard Walking Aids: Tried a single-point cane (SPC), rolling walker (RW), and trekking poles.

Orthotic Interventions: Tried custom Ankle-Foot Orthoses (AFOs) to manage left lower extremity (LLE) foot drop during swing phase. Due to donning difficulty and weight of brace, she deferred use in favor of a lightweight external strap-on sneaker device for dorsiflexion assistance.

Functional Electrical Stimulation / Dynamic Orthoses: Tried the Cionic Sleeve but discontinued due to exacerbated spasticity, difficulty donning, and lack of functional benefit.

Patient-Stated Goals & Subjective Presentation

Goals: Improve walking endurance, gait speed, and lower-extremity strength, while reducing fall-related anxiety and fear of falling.

Subjective Complaints: Expresses profound frustration over experiencing notable functional decline despite radiologically stable findings on serial MRI.

2. Intervention: The Just Walk Protocol

The Just Walk device is a lightweight (~3 lbs), fully mechanical wearable device designed for neuromotor gait rehabilitation. It provides assistance with foot clearance at initial swing while applying adjustable resistance during terminal swing/forward progression, integrating into the natural gait cycle to reinforce physiological gait mechanics. Leann engaged in a 15-week home-based self-logged rehabilitation protocol from June to September 2026.

Protocol Details

Device Setup: Bilateral lower extremity configuration with resistance attached dorsally at Level 1.

Duration & Compliance: 15 weeks daily use; missed <5–10 days total, primarily due to fatigue-induced fall risk.

Dosing Progression: Initiated at approximately 2 × 5 minutes, twice daily; progressed to a continuous single session of 15 minutes daily.

Concomitant Assistive Devices: Activator trekking poles utilized during the majority of training walks; rolling walker utilized during periods of pronounced fatigue.

3. Objective Outcome Measures

Objective functional assessments were conducted at baseline (6/9/2026), mid-point (8/18/2026), and discharge (9/23/2026).

Outcome Measure	Baseline 6/9/26	Mid-Test 8/18/26	Post-Test 9/23/26	Overall Change
Timed Up and Go (TUG)	22.0 s (with SPC)	33.0 s (with SPC)	19.8 s (with SPC)	-2.2 s (Improvement)
10-Meter Walk Test (10MWT)	39.5 s (0.15 m/s) (with SPC)	29.5 s (0.20 m/s) (with SPC)	27.0 s (0.22 m/s) (with SPC)	+0.07 m/s (Improvement)
2-Minute Walk Test (2MWT)	95 ft (with SPC)	88 ft (with SPC)	90 ft (with SPC)	-5 ft
5 Times Sit-to-Stand (5xSTS)	2 reps in 9 s (1 foam pad)	2 reps in 9 s (1 foam pad)	5 reps in 18 s (1 foam pad)	Completed all 5 reps
Activities-specific Balance Confidence (ABC) Scale	36.9%	40.0%	42.5%	+5.6% (Crossed fall risk threshold)

4. Clinical Interpretation & Psychometric Metrics

Timed Up & Go (TUG):

Clinical Value: Showed an overall improvement of 2.2 seconds from baseline (22.0 s to 19.8 s), approaching the Minimal Detectable Change (MDC) threshold of 2.7 seconds established for MS populations.

5 Times Sit-to-Stand (5xSTS):

Clinical Value: While no specific MDC/MCID cutoff is universally standardized for this exact MS cohort, the patient demonstrated a significant gain in functional lower extremity strength and motor planning. At baseline and mid-testing, she could only complete 2 repetitions before fatiguing. By week 15, she completed the full 5-repetition assessment for the first time (18 seconds with 1foampad).

10-Meter Walk Test (10MWT):

Clinical Value: Gait speed improved by + 0.07 m/s (0.15 m/s to 0.22 m/s). While below the MS-specific MDC (0.26 m/s) and MCID (0.13 m/s), it demonstrates a positive trajectory in short-distance walking velocity.

Activities-specific Balance Confidence (ABC) Scale:

Clinical Value: Score improved from 36.9% to 42.5%. Crucially, this improvement moved the patient above the clinical cutoff of <40%, which indicates high fall risk in the MS population.

5. Patient Experience & Qualitative Outcomes

Leann reported positive subjective changes in cognitive focus during gait, post-use carryover, fatigue threshold, and self-efficacy:

Gait Awareness & Carryover: "I felt like it was a lot to focus on at first... Eventually, when I had it on I was able to focus on long steps. When I step through with the left, if I think about it, it is easier and I am focused on it." She noted a noticeable immediate carryover effect after removing the device: "After I was done I would take a break and then walk well for 10–15 min with my cane; leg lifting better and leg feeling lighter."

Fatigue & Endurance Adaptation: Initial transient soreness in the calves occurred early in training. Initial fatigue onset was observed at about 6 minutes during early weeks, but onset shifted significantly later toward the end of the 15-week trial.

Psychosocial Impact & Neuroplasticity: Leann reported improved overall confidence and motivation to engage in longer walks independently at home. She noted: "The longer I use it the better it would be—the more things clicked," recognizing the role of repetitive neuromotor conditioning (neuroplasticity). She highlighted that despite having abandoned prior assistive devices, she remains motivated to continue long-term device use.

6. Discussion & Clinical Conclusion

In a patient with long-standing Secondary Progressive Multiple Sclerosis who previously failed multiple orthotic and electrical stimulation modalities due to spasticity and donning barriers, the Just Walk mechanical neuromotor device provided a tolerable and effective modality for gait rehabilitation. Over 15 weeks of daily home use, the mechanical cueing and progressive resistance contributed to gains in lower extremity functional strength (modified 5xSTS completion), short-distance walking speed, dynamic balance efficiency, and a clinically meaningful reduction in subjective fall risk (ABC scale >40%).

The presence of post-session carryover ("leg lifting better and leg feeling lighter") and improved step-length awareness suggests that mechanical assistance combined with light resistance can facilitate neuromuscular re-education in progressive neurological conditions. Future ongoing use is indicated to maintain and build upon these functional gains.