



From Antalgic Gait to Starting Gate: A Runner's Journey

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History

- 34 year old white female presenting for evaluation of gait abnormality
- Past medical history notable for IgG deficiency, congenital solitary kidney, and recent right fronto-temporal ischemic stroke with consequent PFO closure
- Avid recreational runner
- Normal running pace prior to her stroke was ~8:00 to 8:30 minutes per mile over 3-4 mile distance
- Ischemic stroke diagnosed by MRI 3 months prior to initial presentation
- Endorsed three distinct & substantial changes in her gait during her stroke recovery
 - “Drag & slap” type gait of the left lower extremity due to complete inability to control hip, knee, & ankle
 - “Vaulting” type gait in which she described limited control of the knee and hip but able to vault off of her foot due to improved ankle control
 - “Dipping” type gait with the left knee “giving out” with each step
- Recently discovered that her abnormal gait & left lower extremity weakness resolved within one step of starting to jog
- She is also able to use stairs and do single leg squats without issue

Physical Exam

BP: 118/60 HR: 84 T: 98F BMI: 18.6 kg/m²

General: Well appearing woman in no acute distress

Neurologic

Mental Status: The patient is alert and oriented to person, place, and time with normal speech. Memory is normal and thought process is intact.

Cranial Nerves: (II - XII) Intact

Reflexes: Biceps, brachioradialis, triceps, patellar, and Achilles are 2/4 bilaterally. Sustained clonus at the left ankle. Plantar reflex is downward bilaterally.

Sensation: Sensation is intact bilaterally to pain and light touch. Two-point discrimination is intact.

Motor: Good muscle tone. Strength is 5/5 bilaterally at the deltoid, biceps, triceps, quadriceps, and hamstrings, ankle dorsiflexion, ankle plantar flexion, EHL

Cerebellar: Finger-to-nose and heel-to-shin test normal bilaterally. Rapid alternating movements normal. Gait with walking is abnormal, gait with jogging is normal.

Vascular: Dorsal pedal pulses 2+ in the left foot

Differential Diagnosis

1. Post-stroke neurologic gait abnormality
2. Multiple sclerosis
3. Paraneoplastic syndrome
4. Unilateral peripheral neuropathy
5. Gait Apraxia
6. Conversion Disorder

Functional Analysis

Walking Gait: Antalgic gait with left knee buckling during mid-stance phase* (*Image 9-10 - arrows*). Hips remain level without Trendelenburg. No rotational abnormalities of the lower extremities. Normal ankle dorsiflexion.

Running Gait: Antalgic gait disappears with first step at a jogging pace. Normal jogging gait. There is mild Trendelenburg of the right hip during right leg mid-swing (*Image 5 - asterisk*).

Other: Capable of single leg stance and squat with minimal dynamic valgus on the left leg. Performs tandem stance in plantar flexion without difficulty.

Results

MRI Brain: Restricted diffusion involving posterior right frontal lobe with adjacent involvement of the right centrum semiovale/subcortical white matter. Non-specific hyperintense lesion of the periventricular white matter near the atrium of the right lateral ventricle. Consistent with acute infarction of the posterior right frontal lobe.

CT C/A/P: No mass in the chest, abdomen, or pelvis. No adenopathy. Solitary right kidney. Bilateral hips are normal

EMG/NCS: Motor nerve conduction study performed on bilateral peroneal and tibial nerves. All nerves studied revealed normal latency, amplitude, & conduction velocity. Needle EMG was performed on vastus lateralis, tibialis anterior, medial gastrocnemius, EHL, EDB. All muscles tests revealed normal insertional activity, normal motor unit action potential.

CBC with differential: normal

CMP: normal

Final Diagnosis

Post-stroke neurologic gait abnormality with secondary gait apraxia

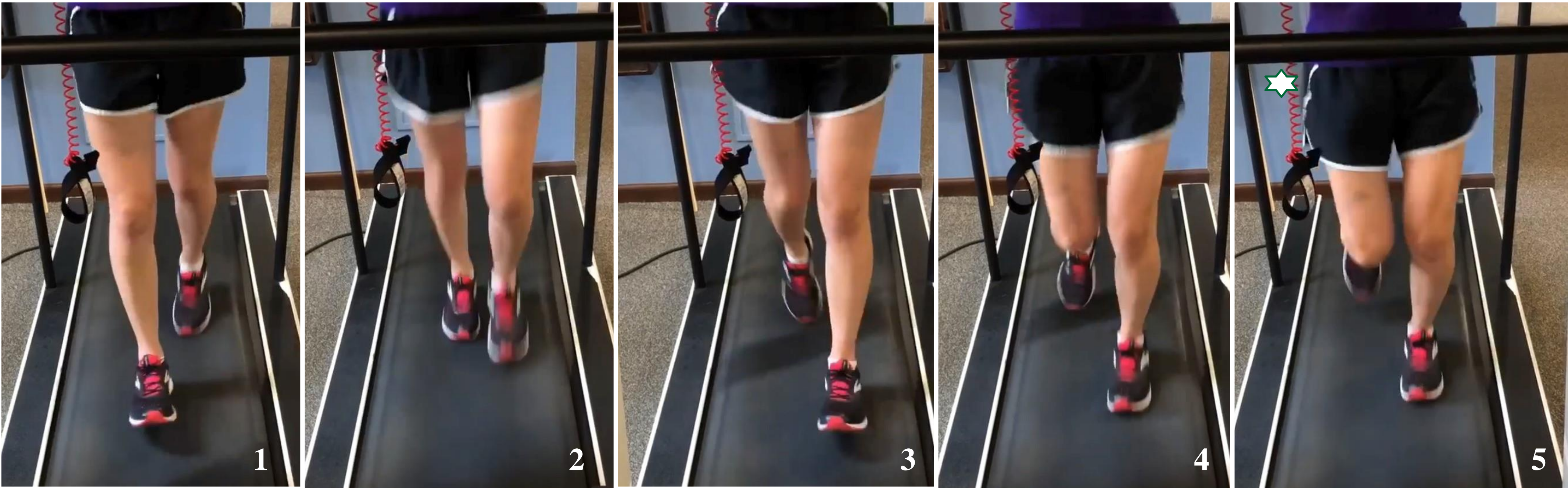
Discussion

Patient's left leg weakness and antalgic walking gait with normal ability at a jogging pace and otherwise normal functional testing of the left lower extremity is unusual. At the time of her initial presentation she had fully recovered from her other stroke related symptoms as exhibited by a grossly normal neurological exam. Interestingly she discovered her ability to jog normally through a *fortunate accident* in which she acted instinctively to chase after her child in a parking lot. Patient's PCP had already ordered imaging studies and initially neurology referral did not recommend EMG/NCS of the left lower extremity. Interestingly she had been through a stressful upheaval in her family life recently but significantly pre-dated her stroke. She was fitted for an AFO and for unknown reasons her walking gait improved with the AFO without her hip/knee giving out. Thus it was theorized that she had recovered from her stroke induced gait abnormality as evidence by a normal functional exam and that she was now suffering from a secondary gait apraxia cause to her antalgic walking gait. Patient was not interested in pursuing counseling or other psychiatric evaluation as an underlying etiology of her gait apraxia.

Outcome/Return to Play

- Patient was referred to Spaulding neurologic rehabilitation for further assessment and physical therapy.
- She was discharged from Spaulding neurologic rehabilitation center with normal functional testing but with persistent abnormal walking gait
- Fitted for a AFO brace per patient preference to be worn at all times with walking and regular ADLs
- Reports more “normal” walking gait with AFO brace while walking
- Allowed to return to running as able without AFO brace support with standard gradual return to running recommendations
- She currently continues to run and is pursuing qualification for the Boston Marathon

Running Gait



Walking Gait

