

# Gait Abnormalities

## Key Learning Points

**Introduction:** Observation of gait is an important aspect of diagnosis that may provide information about several musculoskeletal and neurological conditions. In particular, there are eight basic pathological gaits that can be attributed to neurological conditions: hemiplegic, spastic diplegic, neuropathic, myopathic, Parkinsonian, choreiform, ataxic (cerebellar) and sensory.

## Hemiplegic Gait

The patient stands with unilateral weakness on the affected side, arm flexed, adducted and internally rotated. Leg on same side is in extension with plantar flexion of the foot and toes. When walking, the patient will hold his or her arm to one side and drags his or her affected leg in a semicircle (circumduction) due to weakness of distal muscles (foot drop) and extensor hypertonia in lower limb. This is most commonly seen in stroke. With mild hemiparesis, loss of normal arm swing and slight circumduction may be the only abnormalities.

## Diplegic Gait

Patients have involvement on both sides with spasticity in lower extremities worse than upper extremities. The patient walks with an abnormally narrow base, dragging both legs and scraping the toes. This gait is seen in bilateral periventricular lesions, such as those seen in cerebral palsy. There is also characteristic extreme tightness of hip adductors which can cause legs to cross the midline referred to as a scissors gait. In countries with adequate medical care, patients with cerebral palsy may have hip adductor release surgery to minimize scissoring.

## Neuropathic Gait (Steppage Gait, Equine Gait)

Seen in patients with foot drop (weakness of foot dorsiflexion), the cause of this gait is due to an attempt to lift the leg high enough during walking so that the foot does not drag on the floor. If unilateral, causes include peroneal nerve palsy and L5 radiculopathy. If bilateral, causes include amyotrophic lateral sclerosis, Charcot-Marie-Tooth disease and other peripheral neuropathies including those associated with uncontrolled diabetes.

## Myopathic Gait (Waddling Gait)

Hip girdle muscles are responsible for keeping the pelvis level when walking. If you have weakness on one side, this will lead to a drop in the pelvis on the contralateral side of the pelvis while walking (Trendelenburg sign). With bilateral weakness, you will have dropping of the pelvis on both sides during walking leading to waddling. This gait is seen in patient with myopathies, such as muscular dystrophy.



Normal

**Trendelenburg Sign**  
Drop of pelvis when lifting leg  
opposite to weak gluteus medius

Stanford Medicine 25

### **Parkinsonian Gait**

In this gait, the patient will have rigidity and bradykinesia. He or she will be stooped with the head and neck forward, with flexion at the knees. The whole upper extremity is also in flexion with the fingers usually extended. The patient walks with slow little steps known as *marche a petits pas* (walk of little steps). Patient may also have difficulty initiating steps. The patient may show an involuntary inclination to take accelerating steps, known as festination. This gait is seen in Parkinson's disease or any other condition causing parkinsonism, such as side effects from drugs.

### **Choreiform Gait (Hyperkinetic Gait)**

This gait is seen with certain basal ganglia disorders including Sydenham's chorea, Huntington's Disease and other forms of chorea, athetosis or dystonia. The patient will display irregular, jerky, involuntary movements in all extremities. Walking may accentuate their baseline movement disorder.

### **Ataxic Gait (Cerebellar)**

Most commonly seen in cerebellar disease, this gait is described as clumsy, staggering movements with a wide-based gait. While standing still, the patient's body may swagger back

and forth and from side to side, known as titubation. Patients will not be able to walk from heel to toe or in a straight line. The gait of acute alcohol intoxication will resemble the gait of cerebellar disease. Patients with more truncal instability are more likely to have midline cerebellar disease at the vermis.

### **Sensory Gait**

As our feet touch the ground, we receive proprioceptive information to tell us their location. The sensory ataxic gait occurs when there is loss of this proprioceptive input. In an effort to know when the feet land and their location, the patient will slam the foot hard onto the ground in order to sense it. A key to this gait involves its exacerbation when patients cannot see their feet (i.e. in the dark). This gait is also sometimes referred to as a stomping gait since patients may lift their legs very high to hit the ground hard. This gait can be seen in disorders of the dorsal columns (B12 deficiency or tabes dorsalis) or in diseases affecting the peripheral nerves (uncontrolled diabetes). In its severe form, this gait can cause an ataxia that resembles the cerebellar ataxic gait.

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