

BIOMECHANICS

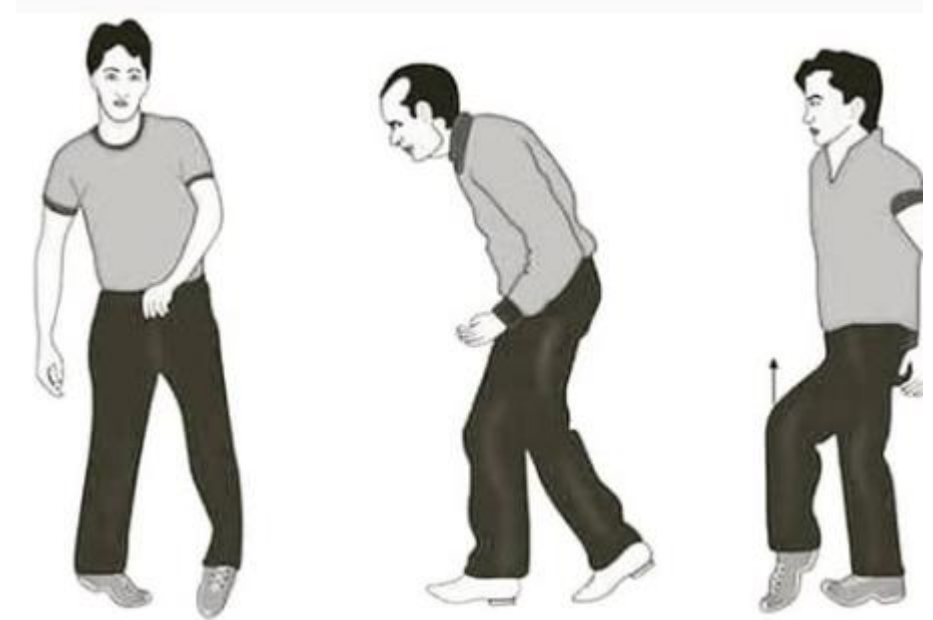
ABNORMAL GAIT

ECE 331 – INTRODUCTION TO BIOMEDICAL ENGINEERING

Monday, December 22, 2025

WHAT IS ABNORMAL GAIT?

1. **Abnormal gait** is a change in walking pattern.
2. Although, one's natural walking style can be unique, **injuries and medical conditions can affect normal walking pattern.**
3. Anything that affects the **brain, spinal cord, legs or feet** can alter the gait pattern.



TYPES OF GAIT ABNORMALITIES

There are many types of abnormal gait. The most common are:

- **Antalgic gait:** The most common type of abnormal gait, caused by pain.
- **Propulsive gait (Parkinsonian gait),** is characterized by a stooped posture, head and neck bent forward, and small steps.
- **Spastic gait (hemiplegic gait)** is characterized by a stiff leg that drags or swings around when lifted.
- **Scissoring gait (diplegic gait)** is characterized by the knees and thighs hitting or crossing in a scissors-like pattern.

Video: [Types of Gait Abnormalities](#)

WHAT CAUSES GAIT ABNORMALITIES? /01

The most common causes of gait abnormalities are:

- 1. Injuries:** Fractures, sprains, tendinitis, and other injuries can affect gait.
- 2. Foot problems:** Corns, calluses, ingrown toenails, warts, sores can make it difficult to walk.
- 3. Joint issues:** Arthritis in the hips, knees, ankles, or feet can affect gait.
- 4. Muscle issues:** Muscle weakness in the pelvic girdle can cause a waddling gait. Inflammation or swelling of the muscles (myositis) can also cause gait abnormalities.
- 5. Nerve issues:** Diseases or injuries to the nerves can affect your gait.

WHAT CAUSES GAIT ABNORMALITIES? /02

- 6. Brain issues:** Brain injury or other brain-related conditions can affect your gait
- 7. Inner ear issues:** Problems with your inner ear can affect your balance and movement
- 8. Vision problems:** Vision problems can affect your gait
- 9. Medications:** Some medications can cause an ataxic gait
- 10. Alcohol intoxication:** Ataxic gait can be a symptom of alcohol intoxication
- 11. Age:** As people age, their gait speed and step length may decline

METHODS USED TO DIAGNOSIS GAIT

Problems in human gait are usually discovered through examination by a physician. The following tests are usually carried out:

- 1. Assess your muscle strength, tone and coordination.**
- 2. Assess the range of motion of the joints used for walking.**
- 3. Check the length of patient legs.**
- 4. Examine patient vision and blood pressure.**
- 5. Examine your neck and spine.**
- 6. Assess patient balance.**

TREATMENT OF GAIT ABNORMALITIES

Treatment for gait abnormalities varies based on the type of gait and its cause. Treatment options could include:

1. **Medication** to treat the underlying condition like arthritis, Parkinson's disease or multiple sclerosis.
2. **Physical therapy** and strengthening exercises.
3. **Surgery**, including hip or knee replacements.
4. **Using assisted mobility devices**, like a cane or a walker.
5. **Adjusting footwear (wearing shoe lifts)** or using splints or braces.
6. **Resting** if abnormality is due to injury.