

## **The Normal Gait Cycle**

Gait is the pattern of movement of the limbs during locomotion. A series of events occur in sequence to produce the correct patterns of walking. A complete gait cycle begins when one foot strikes the ground and ends when the same foot strikes the ground again.

The gait cycle is divided into two phases; *stance* and *swing*.

Stance is the interval in which the foot is on the ground. It is divided into four phases;

- Heel strike to foot flat
- Foot flat through mid-stance
- Midstance through heel off
- Heel off to toe off

Swing is the interval in which the foot is not in contact with the ground. It has two phases;

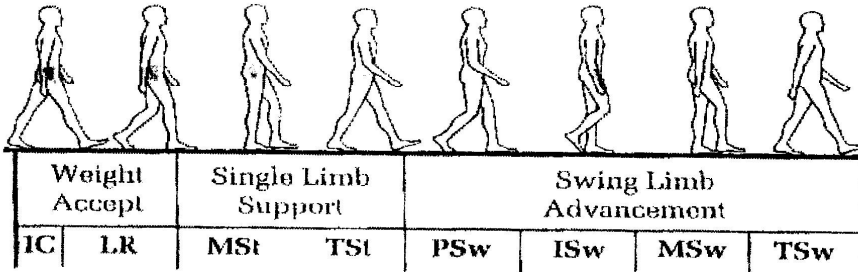
- Acceleration to midswing
- Midswing to deceleration

For a normal gait, the child must have stability in stance, clearance in swing, and adequate stride length. Additionally, in the swing phase, weight transference and foot position should enable correct pre-positioning in the swing phase.

Walking requires great coordination between muscles and a variety of actions from each muscle. Muscles must also switch off at various times during the gait cycle. In children with CP, this is prevented by excessive co-contraction or inappropriate contraction. The muscles may switch “on” or “off” at the wrong time or stay “on” all the time during the cycle causing problems in walking.

## Enabling Motor Functioning in Children with Visual Impairment and Cerebral Palsy

### Gait Cycle



	Phase	Muscles working	Joint position
<b>STANCE 62%</b>	Initial contact (IC)	Hip extensors & abductors Quads and Hams Dorsiflexors	Pelvis rotated forward Hips flex 30 degrees Knee extension Ankle neutral
	Loading Response (LR)	Hip extension and abduction Quads Dorsiflexors	Pelvis rotated forward Hips extending Knee flexion to 15 degrees Plantar flexion to ~15 degrees
	Mid Stance (MSt)	Hip abductors Knee no activity Plantar flexors	Pelvis stops rotation Hips extending Knee full extension Ankle neutral
	Terminal Stance (TSt)	Hip abductors Knee no activity Plantar Flexors	Backward rotation of pelvis Hips extending Knee extended Ankle neutral
	Pre Swing (PSw)	Hip adductors & flexors Rectus femoris Plantar flexors cease Dorsiflexors begin	Pelvis rotated backward Hips extended Knee flexion begins – reaches 35 degrees Plantar flexion to ~20 degrees
<b>SWING 38%</b>	Initial Swing (ISw)	Hip adductors and flexors Rectus femoris Dorsiflexors	Pelvis rotated forward Hips flex 20 degrees Knee flexes to 65 degrees Dorsiflexion
	Mid Swing (MSw)	Hip no activity Knee no activity Dorsiflexors	Pelvis rotated forward Hips flex Knee extension begins Dorsiflexion continue
	Terminal Swing (TSw)	Hip extensors (decelerators) Hams (decelerators) Dorsiflexors	Pelvis rotated forward Hips flex till 30 degree Knee full extension Dorsiflexion to neutral