

Exercise Therapy

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Hemiplegic Gait

Definition

Hemiplegic gait is an abnormal gait pattern characterized by weakness or paralysis of one side of the body, commonly following a stroke, in which the affected upper limb is typically held in flexion and the affected lower limb is advanced by circumduction due to impaired selective motor control and difficulty flexing the hip, knee, and ankle.

Causes

- Stroke.
- Traumatic brain injury.
- Brain tumors affecting motor pathways.
- Cerebral palsy.
- Other neurological lesions involving the corticospinal tract.

Gait characteristics

- The affected upper limb is held in shoulder adduction and internal rotation, with elbow, wrist, and finger flexion.
- The affected lower limb is relatively extended and stiff during walking.
- Circumduction of the affected lower limb occurs during the swing phase.
- Hip hiking may occur to assist foot clearance.
- The affected foot may be plantar-flexed and inverted (equinovarus position).
- The affected arm has reduced or absent reciprocal swing.
- Step length and walking speed are often reduced.
- Weight bearing may be asymmetrical, with impaired balance and increased fall risk.

Gait deviations

- Initial contact: The affected foot may contact the ground with the forefoot rather than the heel due to plantar-flexor overactivity or dorsiflexor weakness.
- Loading response: Controlled knee flexion may be reduced, and the knee may remain extended.
- Mid stance: The affected knee may remain extended or hyperextend, with reduced weight transfer onto the affected limb.
- Terminal stance: Heel rise and forward progression may be altered due to abnormal ankle muscle activity.
- Pre-swing: Knee flexion may be limited, reducing preparation for limb advancement.
- Initial swing: Reduced hip and knee flexion may make toe clearance difficult.
- Mid swing: Circumduction and hip hiking may occur to clear the foot.
- Terminal swing: The affected knee may remain relatively extended, with reduced control of foot positioning before the next contact.

Functional problems

- Difficulty clearing the affected foot during walking.
- Reduced walking speed and endurance.
- Difficulty climbing stairs and negotiating uneven surfaces.
- Impaired balance during standing and walking.
- Increased risk of falls.
- Difficulty performing activities requiring coordinated mobility.

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Joint Movements During Gait: Sagittal, Frontal and Transverse Plane Motions

Gait Cycle Phases

Determinants of Gait

Gait Analysis: Definition, Spatial and Temporal Variables

Gait Cycle: Definition, Phases and Gait Analysis with Diagrams

Human Gait

Reference:

1. O'Sullivan SB, Schmitz TJ, Fulk GD. Physical Rehabilitation. Elsevier.
2. Magee DJ. Orthopedic Physical Assessment. Elsevier.

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