Ambulation Aids

Many orthopedic conditions result in impaired gait. Deconditioning, weakness, pain, postural imbalances, and loss of joint mobility are some of the factors that impair safety, efficiency, and effectiveness of ambulation.

Ambulation aids are an invaluable tool to restoring functional ambulation. Selection of the most appropriate device is determined by medical status and patient goals. PTAs integrate body mechanics, motor learning principles, and safety awareness into mobility training interventions according to the plan of care.

Ambulation aids fitted correctly can allow patients/clients with chronic conditions can conserve energy and maximize participation with mobility. Individuals who are rehabilitating from illness or injury can increase strength, endurance, and confidence throughout the stages of healing and recovery.

Ambulation aides are designed to increase the base of support for standing and walking activities. Torque and other joint stresses can be minimized with an effective use of an ambulation aid. Selection of the most appropriate device is dependent on stability and mobility needs. Overall, ambulation aids can

- decrease pain
- decrease weight barring on involved limbs
- allow for compensation when there are decreases in:
    - coordination
    - endurance
    - balance
    - strength

Factors Influencing Selection of Ambulation Aid:

- patient status (medical history, WB, cognition)
- prognosis for rehabilitation/mobility
- home/work environment
- community activities/demands
- patient/client/family goals

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Summary of Ambulation Aids

Ambulation Aid	Types	Advantages	Disadvantages
Tilt-table	--	Allows for progressive transition to upright position; can adapt for non-weight barring situations	Dependent; tilt is functional up to ~70 degrees
Parallel Bars	Folding Floor Mounted	Allows for maximum stability, support and safety in a functional position	Some challenge with body mechanics by PT/PTA Stability may be challenged with larger/weaker patients
Walkers	Front-Wheel Standard or Pick-up Four-Wheel Hemi	Allows for maximal stability for ambulation/gait training; Potential to increase mobility in community Adjustable Some fold	Some environmental limitations Gait pattern is altered Walking speed is slower Challenging to use with stairs
Axillary Crutches	Wood Aluminum	Allows for increased variability in gait patterns	Less stable Requires relatively good trunk and UE strength

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		Provides support with increasing mobility adjustable Can be used on stairs	Risk for nerve/vessel damage with improper fit/use
Forearm Crutches	Lofstrand Canadian	Allows for increased mobility in patients who are unable to use a cane adjustable Functional on stairs and in narrow areas	Forearm cuff can make it difficult to remove crutch Dynamic qualities may make some patients feel insecure (e.g., elderly)
Quad Cane	Crab Large Base (LBQC) Small Base (SBQC)	Provide a broad base with four points of contact on floor Height adjustable	Can feel unstable with transitioning weight through the device; Results in a slower gait pattern
Cane	Wood (standard) Aluminum Offset handle Pistol grip	Allows for progressive increased mobility Used for added stability during upright activities Aluminum varieties are easily adjusted Offset handle allows for weight distribution	

		through shaft of cane Less environmental constraints; easily stored Inexpensive	

Measurement and Fit - General Guidelines:

- Parallel bars should be 2" wider than greater trochanters
- ambulation aid grip/handle should line up with greater trochanter or ulnar styloid process (wrist crease) when the patient is in static standing
- a range of 20 to 30 degrees of elbow flexion is optimal
    - measure from the greater trochanter to the patient's heel to determine grip/handle height if the patient needs to remain supine
    - forearm crutch cuff should be 1-1.5 inches distal to elbow crease
    - allow approximately 2 inches from the axilla to the axillary rest during standing/gait activities to minimize risk for neurovascular compression

Common Errors:

- measurements are not adjusted for postural imbalances in upright positions
- measurements do not account for footwear
- measurements are not confirmed in standing
- optimal resting standing position is not maintained during measurements
    - crutches/cane - positioned too far or too close (ant/posterior/lateral) to lower extremities
    - walker - feet are too far anterior/posterior of rear legs