Ambulation is a crucial activity to be able to perform ADL’s. PT’s and PTA’s choose the BEST ambulation aid (assistive device) which will give the stability needed.

- Improve functional ability & safety
- Compensate for decrease in balance or strength, pain with weight bearing, weight bearing restriction, absence of a LE, assist with fracture healing
Purpose of Ambulation Aide

- Improve stability by increasing BOS
- Reduce weight bearing on 1 or both LE’s
- Permit safe mobility

Preparing for Ambulation

- Obtain pertinent info from medical record
  - Has pt. used A.D. before?
  - Strength?
  - Balance?
  - Cognition?
  - Dx?
  - PMH?

Preparing for Ambulation

- Assess pt.’s ability to understand & participate
- Assess & determine best A.D., wt bearing status, & gt pattern
- Make environment safe for gait activities
- Check A.D. for fit and safety
Preparing for Ambulation

- Teach gait pattern with A.D., wt bearing status; teach by verbal instructions, demonstrations, & pt practice
- Apply gait belt
- Guard correctly
- Maintain proper body mechanics

Muscles Needed for Gait with A.D.

- Scapular Stabilizers
- Elbow Extensors
- Elbow Flexors
- Finger Flexors
- Hip Extensors
- Knee Extensors
- Ankle Dorsiflexors
* What are the names for the muscles?

Precautions for Ambulation

- Foot wear
- Monitor HR, general appearance, mental alertness
- Use Gait Belt
- Guard: pt could lose balance or experience syncope at any time
- Guard using correct technique
- NEVER leave patient alone
- Protect IV, catheters, privacy
- Remove obstacles in path
Pre-Gait Activities

- Appropriate strengthening exercises
- Weight shift activities/balance
- Instruction in weight bearing status

Types of Assistive Devices for Gait & Gait training

- Parallel Bars
- Walker
  - Standard
  - Roll/wheeled
  - Forearm
  - Folding
- Crutches
  - Axillary
  - Lofstrand
- Cane
  - Straight
  - Quad (large or small base)
  - Hemiwalker

Measurement & Fit of A.D.'s

- May do the initial fit with the patient supine, BUT always check in standing to determine if fits correctly!
- Incorrect fit reduces safety!
- Parallel bars: greater trochanter/pt's wrist crease
- Walkers: greater trochanter/ pts wrist crease
- Canes: greater trochanter/ pts wrist crease
Measurement & FIT of crutches

- Axillary pad of crutch should be 2-3 fingers below pt.'s axilla (2 inches)
- Elbow Angle with hand on crutch hand grips = 20-30 degrees of elbow flexion
- Pt should be in TRIPOD position when assessing the above!!!!

Common Errors in Fitting Crutches

- Patient raises shoulders
- Patient drops shoulders
- Patient flexes at the trunk or hips
- Patient flexes/extends wrist and handpiece is positioned to high
- Patient shoes change height
- Crutch eval without patient being in the tripod position

Confirmation of fit for Crutches

- Confirmation of fit
  - Stand in tripod position
    - Crutch tips 6-8 inches anterior to toes; 2-4 inches lateral
  - Shoulders relaxed
  - Trunk upright
  - Hips extended
  - Pelvis level
  - Knees slightly flexed
  - Feet flat on floor (unless wt bearing restriction
Measurement & Fit of Crutches

- Axillary Crutches – ways to measure
  - Multiply pt's height by 77%
  - Subtract 16 inches from pt's height
  - Measure from anterior axillary fold to 6-8 inches lateral to pt's heel; pt should be supine for safety
  - Have pt abduct shoulder to 90 with elbow extended on one side; shoulder abducted to 90 with elbow flexed to 90 on opposite side; measure from elbow of flexed UE to middle finger of arm that is extended

Measurement & Fit of Lofstrand Crutches

- Hand grip 20-30 degrees of elbow flexion
- Can measure handgrip like you measure for canes or walkers
- Forearm piece should be 1 to 1.5 inches inferior to olecranon process
- Confirm fit with crutches 2 inches anterior to toes and 4-6 inches lateral

Basic Gait Patterns

- Choose Gait pattern based on:
  - Balance
  - Strength
  - Coordination
  - Functional needs
  - Weight bearing status
  - Energy level/endurance
  - Diagnosis
Gait patterns

- Type gait pattern chosen determines:
  - Speed of ambulation
  - Energy expenditure
  - Base of support (BOS)
  - Difficulty

Gait Patterns

- 3 point (NWB)
- 3 point modified or 3 point 1 (PWB)
- 4 point
- 2 point
- 4 point modified
- 2 point modified
- Swing through
- Swing to

3 Point Gt Pattern

- For unilateral NWB
- Crutches or walker
- Move A.D, then hop forward onto unaffected LE
- Walker or crutches
- Can NOT perform this gait pattern with 1 cane or 1 crutch
3 point 1 or 3 point modified
- PWB on one LE
- Move A.D., then PWB LE, then unaffected LE
- Walker or crutches
- Can NOT perform this gait pattern with just 1 cane or 1 crutch

Four Point
- 2 crutches or 2 canes
- Alternate/reciprocal forward movement
- i.e. left A.D., then right foot, then right A.D., then left foot
- Often used when patient has bilateral involvement
- What types of diagnosis would this be appropriate for or not appropriate for?

Four point
- Advantages
- Disadvantages
Two Point

- 2 crutches or 2 canes
- Simultaneous/reciprocal forward movement
  - i.e. right crutch & left foot THEN left crutch and right foot
- Two point gait pattern is NOT used with pt.’s with weight bearing restrictions
- Two point may be used with bilateral weakness or balance deficits

MODIFIED two or four point

- Modified means instead of an A.D. on each side, now there is only ONE A.D. on one side
- When using only 1 cane or crutch, the A.D. is placed on the opposite side of the affected LE
- Modified 2 pt & modified 4 pt can NOT be used with wt bearing restrictions i.e. PWB, NWB
- Modified gait patterns are appropriate for a pt with unilateral weakness or mild balance deficits

Two point

- Advantages

- Disadvantages
**Modified four point**
- 1 ambulation aide i.e. cane or crutch
- Cane is held in opposite hand of involved LE
- Move cane, then involved leg, then uninvolved leg
- Modified 2 point: move cane and involved leg simultaneously, then uninvolved

**Modified two point**
- 1 crutch or 1 cane
- Move cane AND involved leg simultaneously, then uninvolved leg
- Advantages? Disadvantages?
- Type Diagnoses not appropriate for?

**Swing to & Swing through**
- Used with lofstrand crutches
- Bilateral weakness
- Hand on Y ligament to maintain hip & knee extension
- Swing through will be faster than swing to
- Swing through = both LE’s swing forward simultaneously and land anterior to crutches
- Swing to = both LE’s swing forward simultaneously and land even with crutches
Gt Patterns & Appropriate A.D.’s

<table>
<thead>
<tr>
<th>Type Gt pattern</th>
<th>A.D.’s appropriate?</th>
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<tbody>
<tr>
<td>3 point</td>
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<td>3 point 1</td>
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<td>4 point</td>
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<td>4 point modified</td>
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<td>Swing through</td>
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<td>Swing to</td>
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Guarding

- Must use Gait Belt
- Stand behind and slightly to one side of pt
- SPTA one hand above pt’s shoulder, other hand supinated holding gait belt
- SPTA Feet in A-P position
- SPTA outermost LE moves anterior
- SPTA innermost LE is b/n A.D. and pt’s LE

Sit to Stand with walker

- Scoot toward front of chair
- Position feet correctly (ankle slightly behind knees unless wt bearing restriction)
- Wt bearing restriction LE is positioned with foot anterior to knee
- Walker in front of chair
- Pt LEANS forward & pushes on arm rests
- Reach for walker with hand on affected LE side 1st then with hand on unaffected side
Stand to Sit with walker

- Step back until back of LE's touches chair
- Position feet correctly (ankle slightly behind knees unless wt bearing restriction)
- Wt bearing restriction LE is positioned with foot anterior to knee
- Walker in front of chair
- Pt reaches back for chair with hand of unaffected side 1st
- Reach with hand on affected side 2nd

Sit to Stand with Crutches

- Scoot forward in chair
- Both crutches held on affected side with hand on hand grip
- Hand on unaffected side is on arm rest of chair
- Position feet slightly behind knee; if wt bearing restriction foot positioned anterior to knee
- Lean forward and push to standing
- Gain balance then place one crutch under axilla on unaffected side
- Other crutch then placed under axilla of affected side
- Assume tripod position

Stand to sit with crutches

- Back up until LE's against chair
- Place both crutches on affected side; hold to crutches at handgrip
- Position feet with affected LE forward if wt bearing restriction
- Reach for armrest with hand on unaffected side
- Lower to chair
Sit to Stand with Canes
- Scoot forward in chair
- Position cane on unaffected side
- Position feet slightly behind knees
- Lean forward & push up from armrests
- Take hold of cane
- *if straight cane can have in hand as push from armrest

Stand to sit with Cane
- Back up until feel back of LE's touch chair
- Reach for armrest with free hand
- Reach for armrest with other hand
- Lower self to chair

Stairs & A.D.’s
- “Up with the good”
- “Down with the bad”
- For crutches, and canes use the following
- Going UP stairs
  - First: good “unaffected” LE
  - Second: “bad/affected “ LE
  - Third: A.D.
Stairs & A.D.’s

- Going DOWN stairs
  - First = A.D.
  - Second = bad/affected LE
  - Third = good/unaffected LE

*these gt patterns on stairs help to protect the weaker LE and improve safety

Walkers Going UP Stairs

1st Walker turned sideways with closed portion next to pt.
2nd Position top end of walker 1 step above patient
3rd Hand positioned on top end of walker
4th Good LE
5th Affected LE

Walkers Going DOWN Stairs and guarding with

1ST Walker turned sideways with closed portion next to pt.
2ND Position bottom end of walker 1 step below patient
3RD Hand position on bottom end of walker
4th Affected LE
5th Good LE
Guarding from behind with patient going DOWN stairs

Crutches on Stairs

- Up
  - 1st unaffected LE
  - 2nd affected LE
  - 3rd crutches
  - Or 1st unaffected LE
    - 2nd affected LE AND Crutches

- Down
  - 1st crutches
  - 2nd affected LE
  - 3rd unaffected LE
  - OR 1st crutches AND affected LE
  - 2nd unaffected LE

Guarding going UP stairs

- Position posterior and slightly lateral to pt (weakest side)
- Maintain wide stance with your feet, your feet should have 1 foot on same step as pt.'s and 2nd foot one step below pt.'s
- One and supinated holding gait belt
- One hand above pt.'s shoulder
Guarding in front with patient going DOWN stairs

- Maintain wide stance; one foot on step pt descending to; other foot below
- One hand at pt.'s anterior chest/shoulder
- One hand supinated holding to gait belt

Affected LE Modifications to normal technique

Full length cast
- Going up
  - extend/ER to go up
  - affected leg trails crutches
- Going down
  - flex hip so heel clears
  - affected leg leads crutches

Cane on Stairs or a step

- UP
  - 1st Strongest, unaffected LE
  - 2ND Cane & affected LE
- DOWN
  - 1ST Affected LE
  - 2nd Strongest, unaffected LE & AD

* assistive device goes with affected LE in MOST cases but not all
Choosing Best A.D. & Gait Pattern

- Dx
- Age
- PMH
- Previous functional level
- Home environment
- Work environment
- Type work
- Restrictions
- Strength
- Coordination
- Balance
- Current functional abilities
- Cognition
- Assistance at home?

Functional Ambulation

- Functional activities selected depend on pt.’s needs, goals, normal and anticipated activities, problems, A.D.
- Transfers – must be able to get up from a variety of surfaces to amb
- Level surfaces
- Uneven surfaces: yard, ramps, curbs, stairs
- Include precautions i.e. wet floor, throw rugs, crowded rooms etc