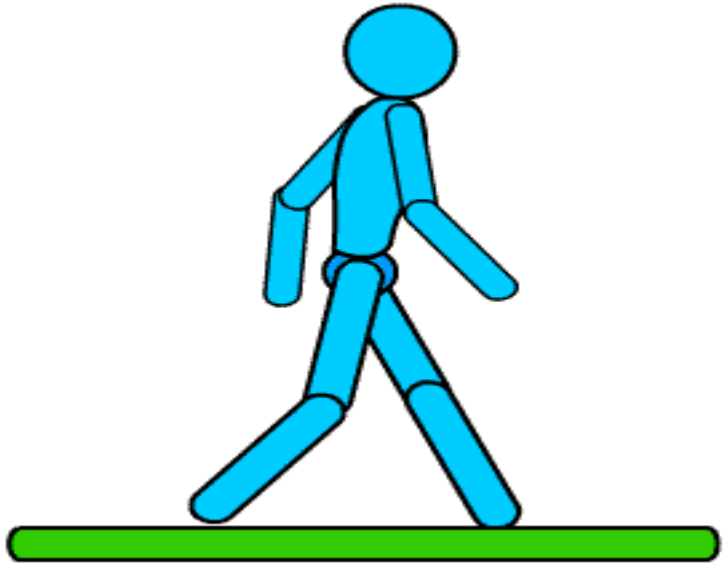

WALKING AIDS

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WALKING AIDS

Walking aid is a device designed to assist walking and improve the mobility of people who have difficulty in walking or people who cannot walk independently.

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Purpose of walking aids

- Increase area of support or base of support
- Redistribute weight-bearing area by decreasing force on injured or inflamed part or limb
- Can be compensate for weak muscles
- Decrease pain
- Improve balance
- Improves proprioception

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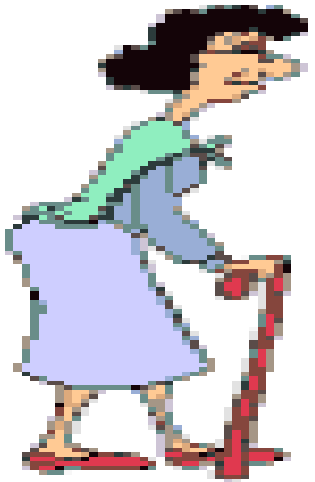
Different Types of Walking Aids

walker

Cane/Stick



crutches

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Selection

- Stability of the patient
- Strength of upper and lower limbs
- Co-ordination of upper and lower limbs
- Required degree of relief from weight-bearing

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Clinical descriptors of weight bearing status

- Full weight bearing (FWB)
- Non weight bearing (NWB)
- Partial weight bearing (PWB)
- Toe touch weight bearing (TTWB)
- weight bearing as tolerated (WBAT)

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Parallel Bars

- Rigid
- Support through the length of bars
- Enables patients to concentrate on lower limbs
- A full length mirror placed at one end

- Adjustment: height of the bar should be at the level of greater trochanter

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CANES

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Canes

- Most common mobility aid
- Commonly made of wood or aluminium
- Transmits 20-25% of body weight
- Held in hand opposite the involved side
- Compensates for muscle weakness
- Relieves pain
- Elbow at 30° flexion

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Advantages -

- Improves balance & postural stability
- Reduce biomechanical load on LE joints
- Widens base of support
- Reduces forces on hip while walking
- Reduces knee pain in OA knee patients
- Restricted in NWB & PWB

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TYPES OF CANE

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Standard cane

Standard adjustable aluminum cane

Standard adjustable aluminum cane

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Tripods

- Made of aluminium alloy or steel
- Three rubber tipped legs at

  corner of an equilateral triangle
- Handgrip in same plane as a line

  joining two legs nearest and parallel to patient's foot
- Elbow at 30° flexion
- More stable

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Quadrupeds

- Has four rubber tipped legs
- More stable
- Adjustable hand grip height
- Provides broad base
- Each point is covered with a rubber tip
- Disadvantage – pressure exerted on handle may not be centered, causes instability; may not be used on stairs; slower gait pattern

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Hemi cane

- Provides a very broad base
- Legs are angled to maintain floor contact to improve stability farther from body
- Handgrip is molded with plastic
- Fold flat & adjustable in height
- Easy for travel & storage
- May not allow pressure to be centered
- Can not be used on stairs
- Require slow forward progression
- Costly

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Handgrip

- General consideration relevant to all canes is nature of handgrip.
- Variety of styles & sizes are available.
- Type of handgrip should be selected based on
  - Patients comfort
  - Grips ability to provide adequate surface area to allow effective weight transfer while walking
- Types of handgrips –
  - Crook handle
  - Straight offset handle
  - T – shaped handle

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Measuring canes

- Cane is placed approximately 6inches from the lateral border of the toes.
- 2 important landmarks for measurement are- greater trochanter & angle of elbow
- Top of cane should come at the level of greater trochanter & elbow flexed to 20-30 degrees (allows arm to shorten & lengthen during gait cycle; provides shock absorption mechanism)
- Height should be considered with regard to patients comfort & cane's effectiveness in accomplishing purpose

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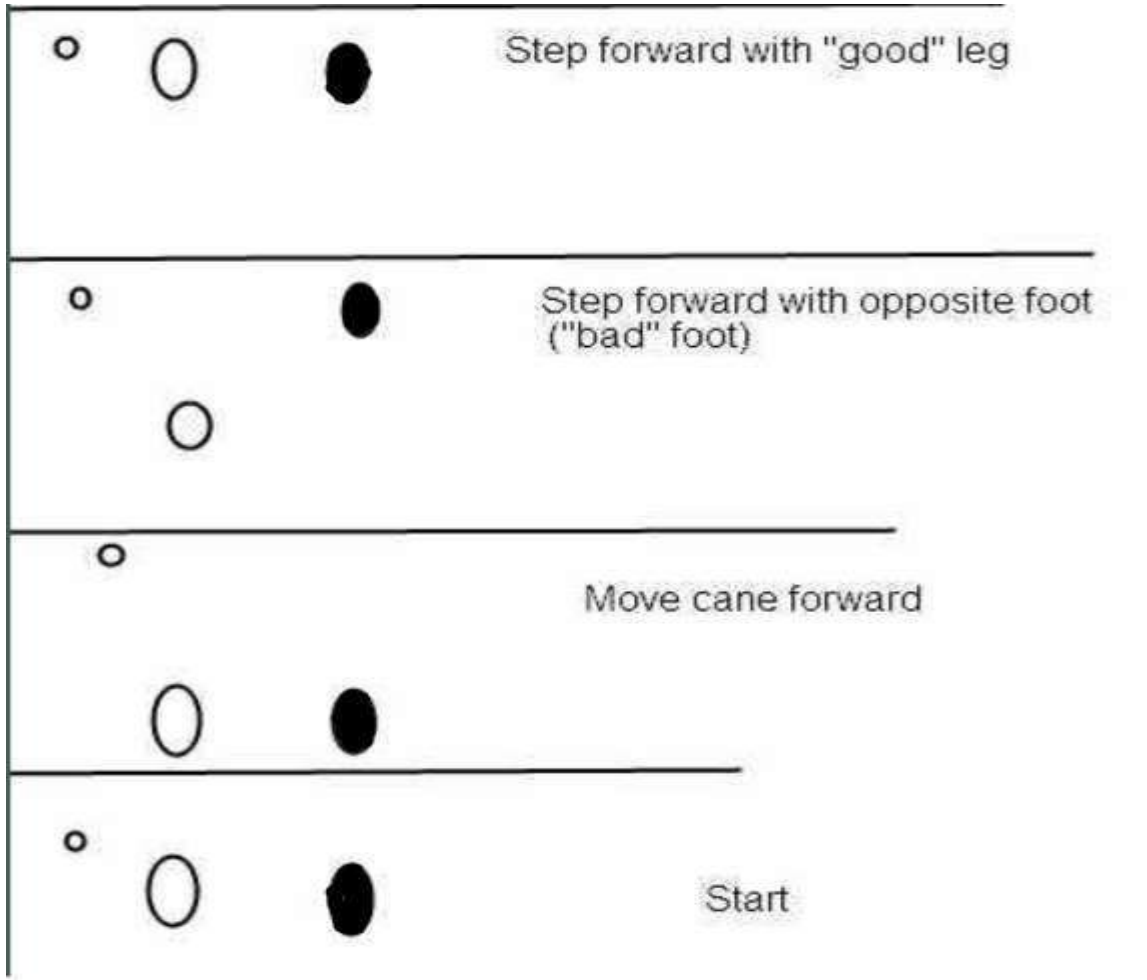
Gait pattern with cane



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WALKER (WALKING FRAME)

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Walking Frames

- Used to improve balance & relieve weight bearing
- Greatest stability
- Provide wide BOS, improve anterior & lateral stability, allows UE to transfer body weight to floor.
- Typically made of aluminium with moulded vinyl handgrip & rubber tips
- Adjustable adult size- 32-37inches (81-92cms)

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Types:-

1. Standard
2. Reciprocal
3. Rollator

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Other Variants of Walking Frame

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CRUTCHES

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- Used most frequently to improve balance & to relieve weight bearing (fully/partially)
- Typically used bilaterally – to increase BOS, improve lateral stability, allows UE to transfer body weight to the floor.
- 2 basic designs of crutches in clinical use are :-
  - Axillary crutches
  - Forearm crutches

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Prerequisites for crutches

- Good strength of upper limb muscles is required.
- Range of motion of upper limb should be good.
- Muscle group which should be strong are –
  - Shoulder flexor, extensors and depressor
  - Shoulder adductors
  - Elbow and wrist extensors
  - Finger flexors

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Axillary crutches /under arm crutches

- Referred as standard crutches.
- They are made of lightweight wood or metal with an Axillary bar, a hand piece and double uprights joined distally by single leg covered with rubber suction tip.
- Single leg allows height variations.
- Both the overall height of the crutch & height of the handgrip can be adjusted.
- Adjustable adult crutch size is 48-60 inch.

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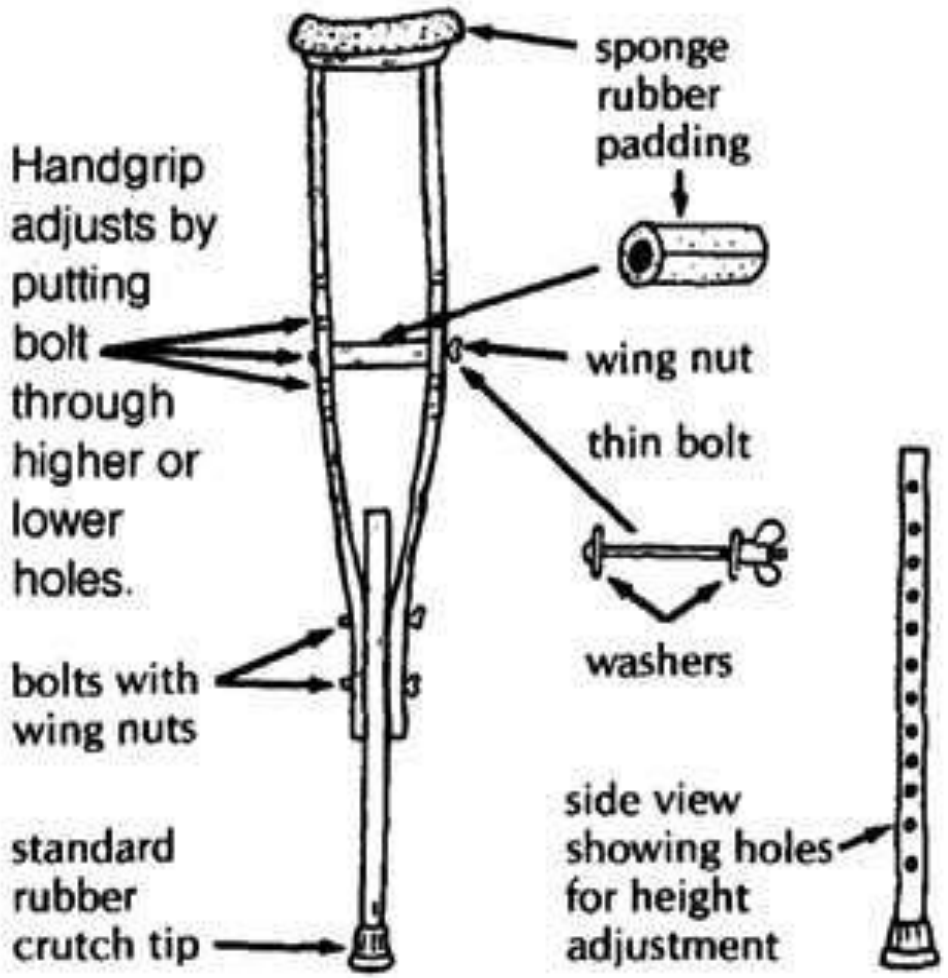

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- Advantages –
  - Improve balance & lateral stability
  - Provide functional ambulation with restricted weight bearing
  - Easily adjustable
  - Inexpensive
  - Can be used for stair climbing easily
- Disadvantages –
  - Limited upper body freedom
  - Axillary crutches require good standing balance by the patient.
  - Tendency to lean forward on axillary bar (pressure on radial groove - potential damage to vascular structures)

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Platform attachment

- Also referred as forearm rest or troughs.
- Also used with walkers.
- Function – to allow transfer of body weight from forearm to assistive device.
- Used when weight bearing is contraindicated through wrist or hand.
- Forearm piece is usually padded, has a dowel or handgrip, has hook or loop strap to maintain position of forearm.

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Measurement of length

- Several methods are used but most common is in standing & supine position.
- Measurement in standing is most accurate & preferred approach.
- standing –
  - Supported standing –from 2inches below the axilla to 2inches anterior & 6inches lateral to the foot.
  - With shoulder relaxed adjust the hand piece to provide 20-30 degrees of elbow flexion.
  - General estimate – subtract 16inch (40.64cms) from patient's height.

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measurement of axillary crutches

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Forearm crutches

- Also known as lofstrand / elbow / canadian crutches.
- They are made of aluminum.
- Design includes a single upright, a forearm cuff & a handgrip.
- It adjusts both proximally (position of forearm cuff) & distally (height of crutch); using push button mechanism.
- Generally adult sizes are 29-35inches (74-89cms)
- Distal end of crutch is covered with rubber suction tip.
- Forearm cuffs are available with either medial or anterior opening.

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MEASUREMENT :

- Position of choice – supported standing
- From 1-1.5inches below the elbow to Distal end at a point 6inches lateral & 2inches anterior to the foot.
- Shoulders should be relaxed & elbow maintained at 20-30degrees flexion.
- Cuff placement at the proximal third of the forearm.

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Preparation For Crutch Walking

- **Arms:** shoulder extensors, adductors and elbow extensors even all muscles of arms must be assessed and strengthened before the patient starts walking. The hand grip must also be tested to see that the patient has sufficient power to grasp hand piece.

  Legs: Strength and mobility of both legs should be assessed and strengthened if necessary. Main attention to the hip abductors and extensor, the knee extensors and the plantar flexors of the ankle should be given.

- **Balance:** sitting and standing balance must be tested.
- **Demonstration:** the physiotherapist should demonstrate appropriate crutch walking to the patient.

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Crutch walking

- During first time, when the patient is to stand and walk, the physiotherapist should have an assistant for supporting the patient.

  Non-weight bearing: patient should always stand with a triangular base i.e. crutches either in front or behind the weight bearing leg

- **Partial weight bearing:** The crutches and the affected leg are taken forward and put down together. Weight is then taken through the crutches and the affected leg, while the unaffected leg is brought through.

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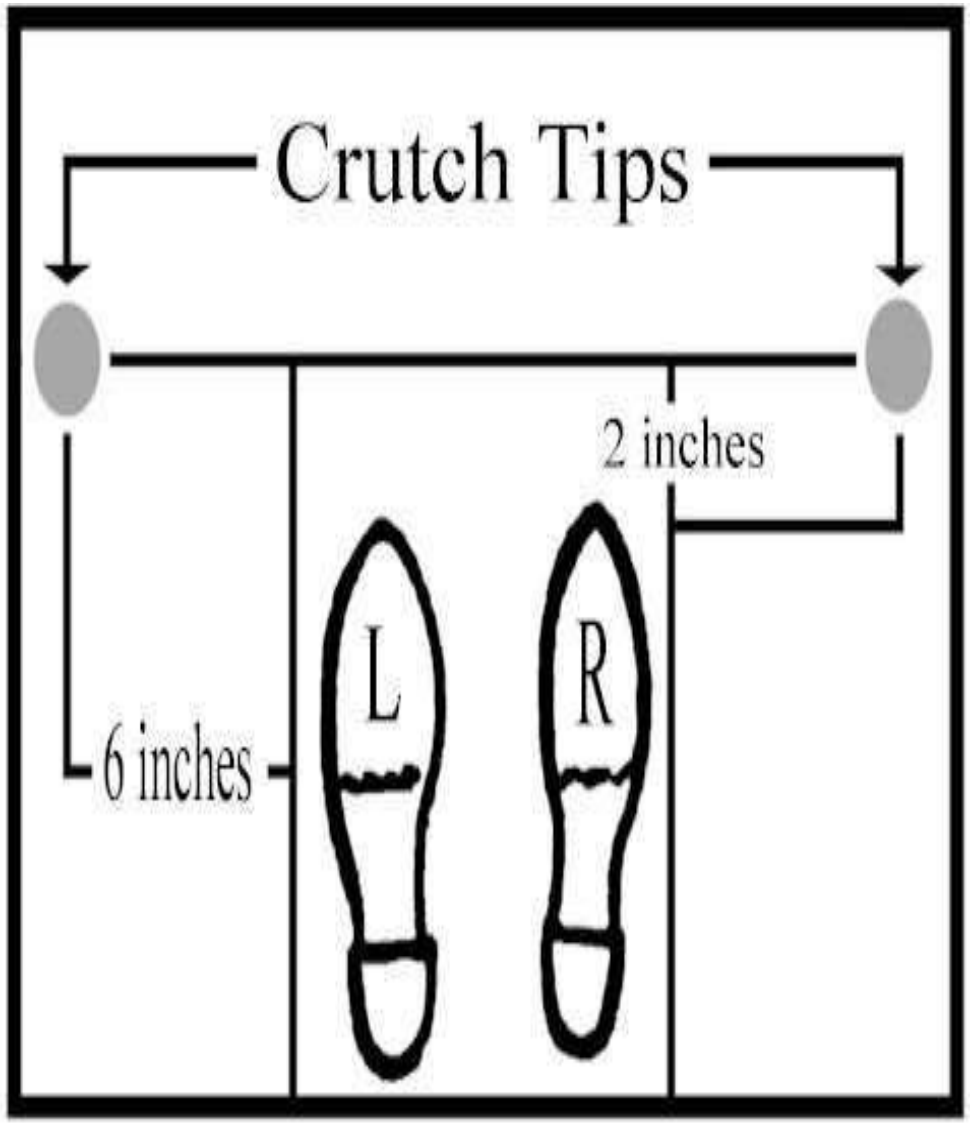

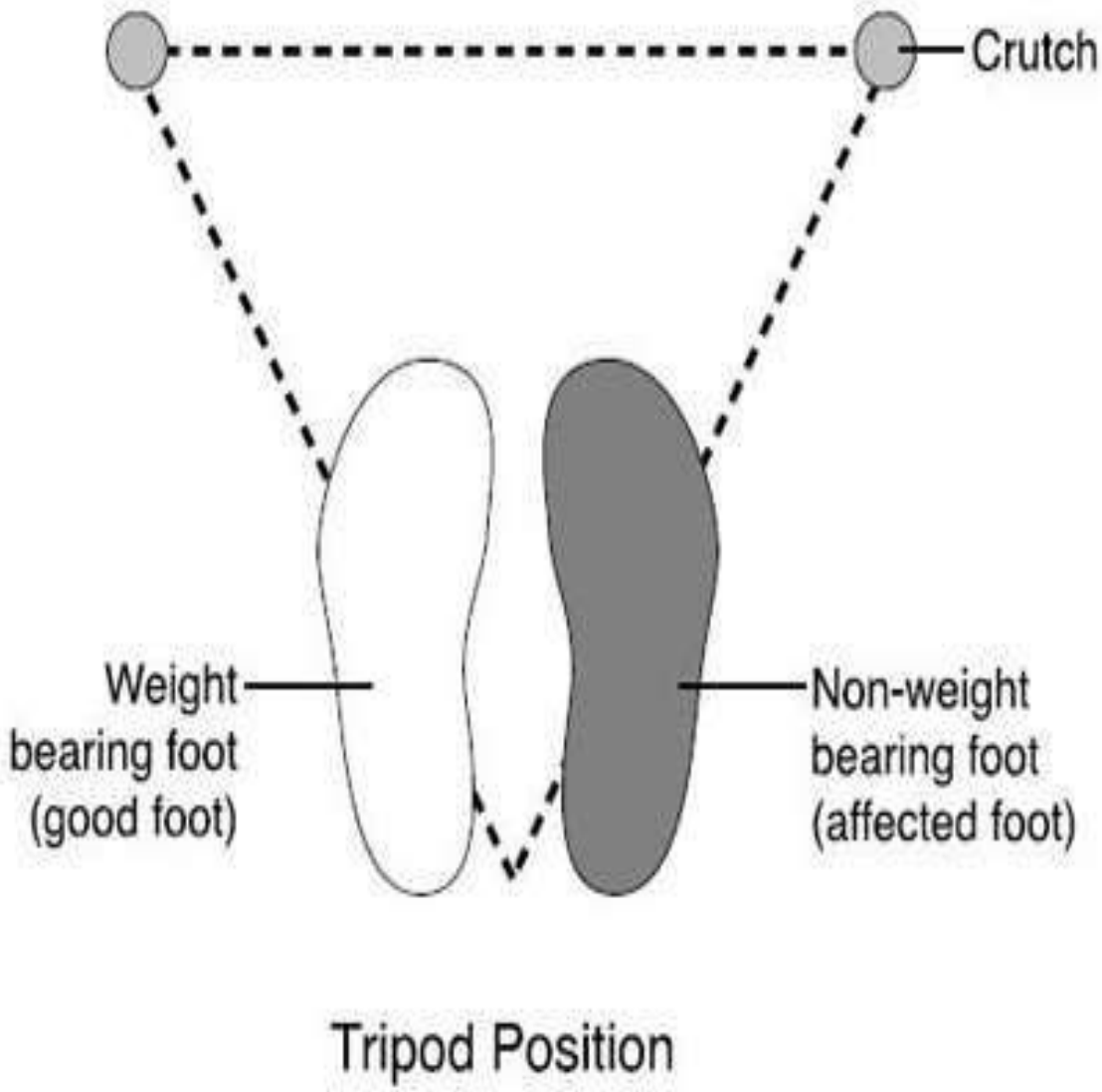

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Gait pattern with crutches

- Four point gait
- Three point gait
- Two point gait
- Two point swing through gait
- Two point swing to gait (the feet are advanced by a much shorter distance and placed behind the level of crutches)

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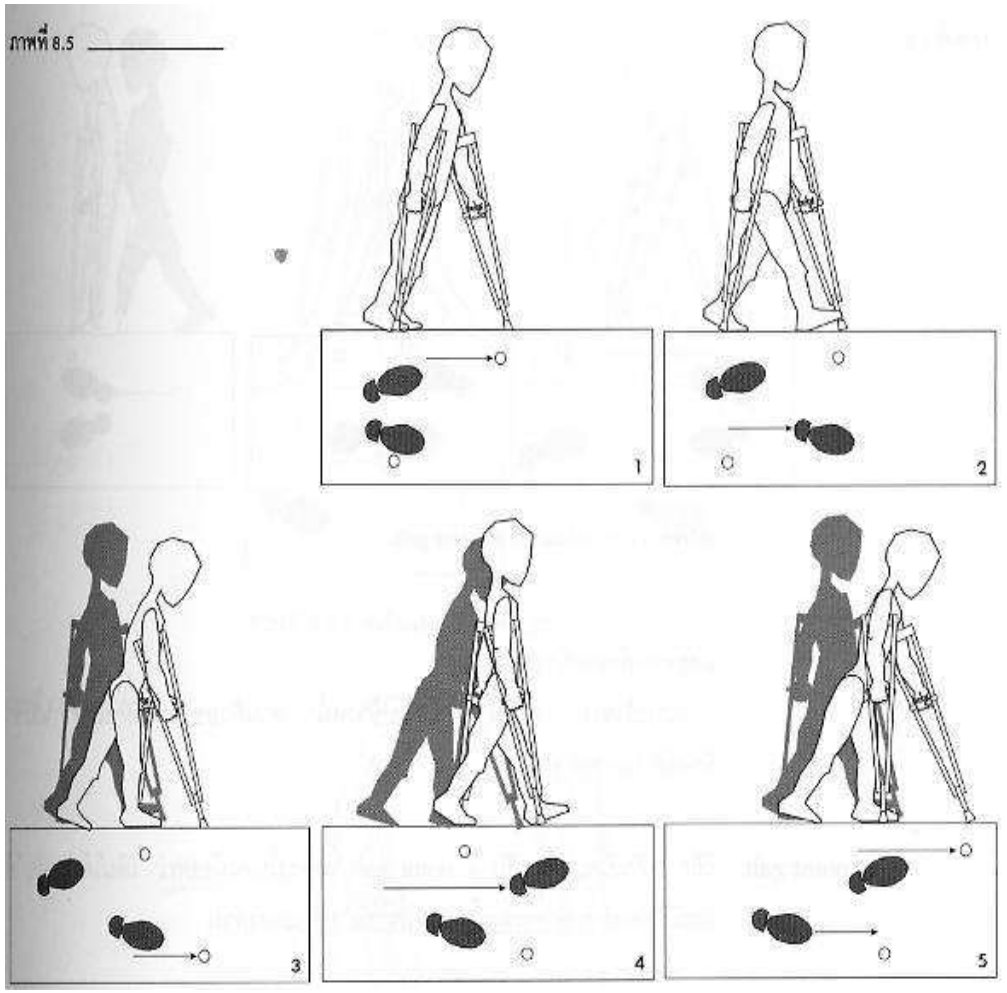
Four-point gait

In this gait pattern one crutch is advanced and then the opposite lower extremity is advanced. For example, the left crutch is moved forward, then the right lower extremity, followed by the right crutch and then the left lower extremity.

- Slow, Good stability - at least 3 point contact ground

  Weight is on both lower extremities and used with bilateral involvement due to poor balance, in coordination(Ataxia) and muscle weakness



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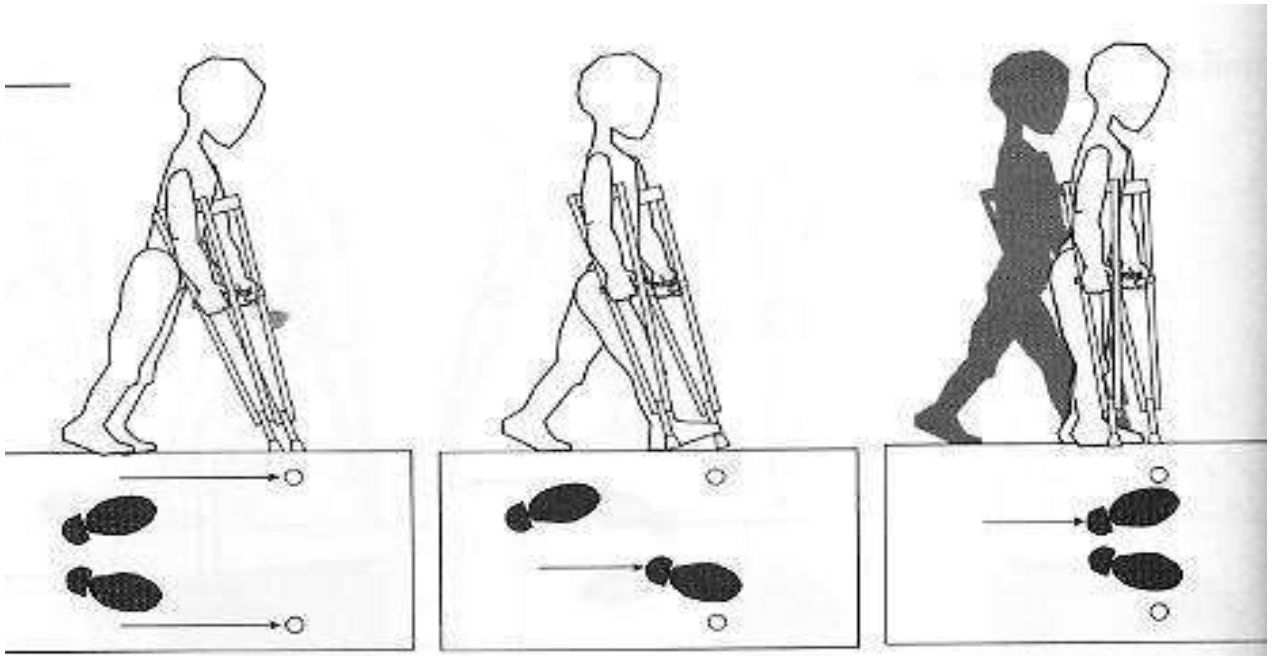
Three-point gait

- In this type of gait three points of support contact the floor.
- Non-weight-bearing gait for lower limb fracture or amputation



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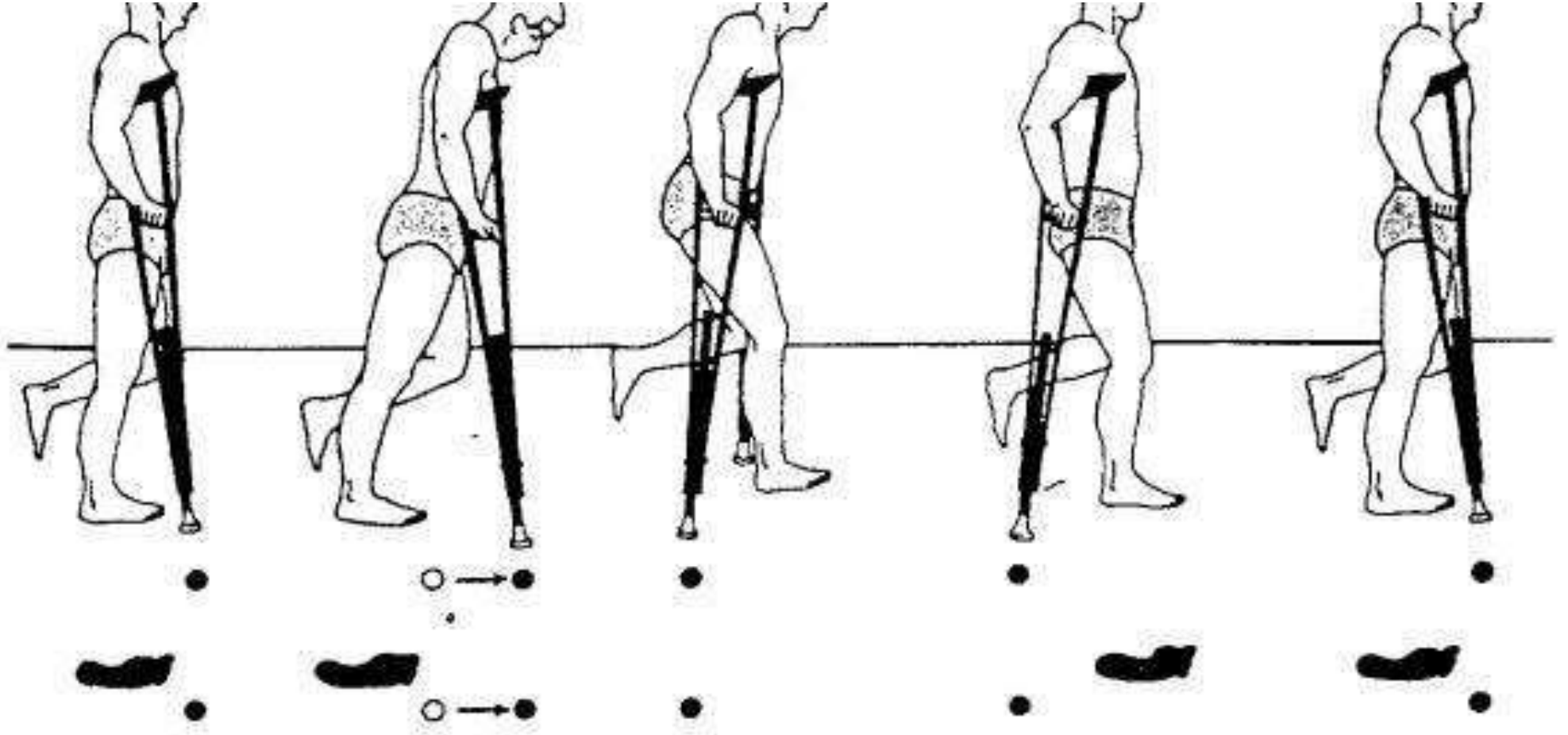
Non Weight Bearing



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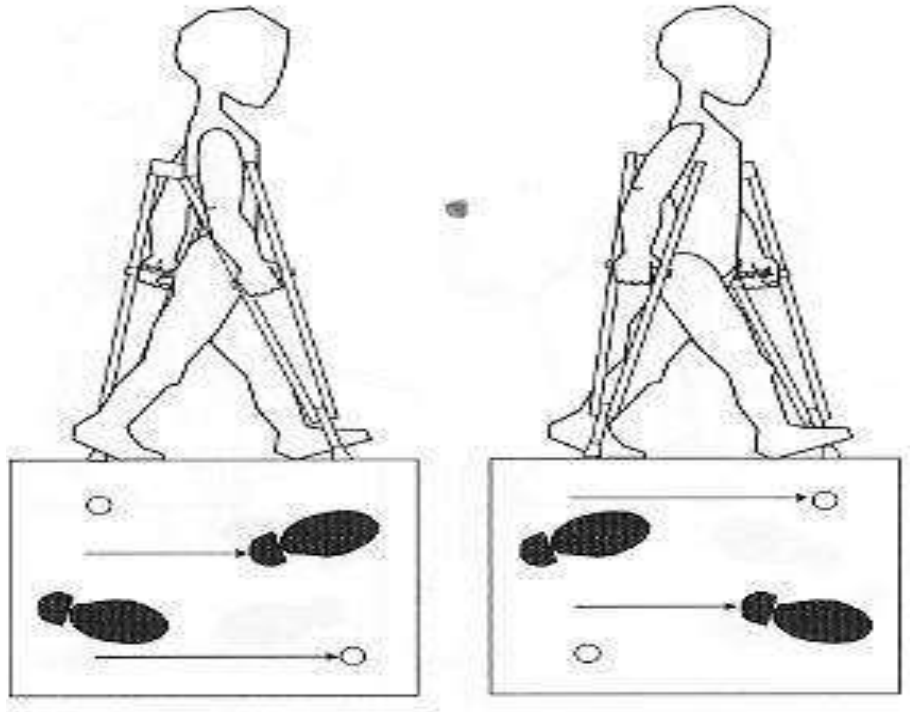
Two-point gait

- This gait pattern is similar to the four-point gait. However, it is less stable because only two points of floor contact are maintained. Thus, use of this gait requires better balance.
- The two-point pattern more closely stimulates normal gait, in as much as the opposite lower and upper extremity move together.



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- Two additional, less commonly used crutch gaits are the swing-to and swing-through patterns. These gaits are often used when there is bilateral lower extremity involvement, such as in spinal cord injuries.

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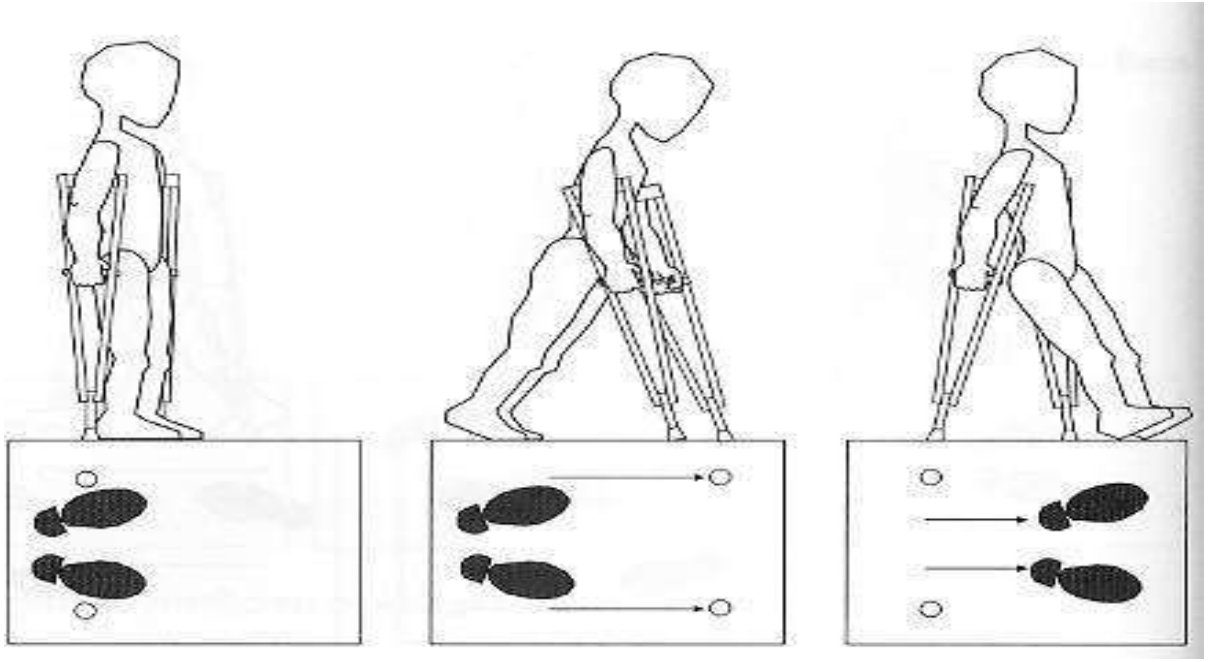
Swing-through gait

- Fastest gait, requires functional abdominal muscles
- In the swing-through gait, the Crutches are moved forward together, but the lower extremities are swing beyond the crutches.



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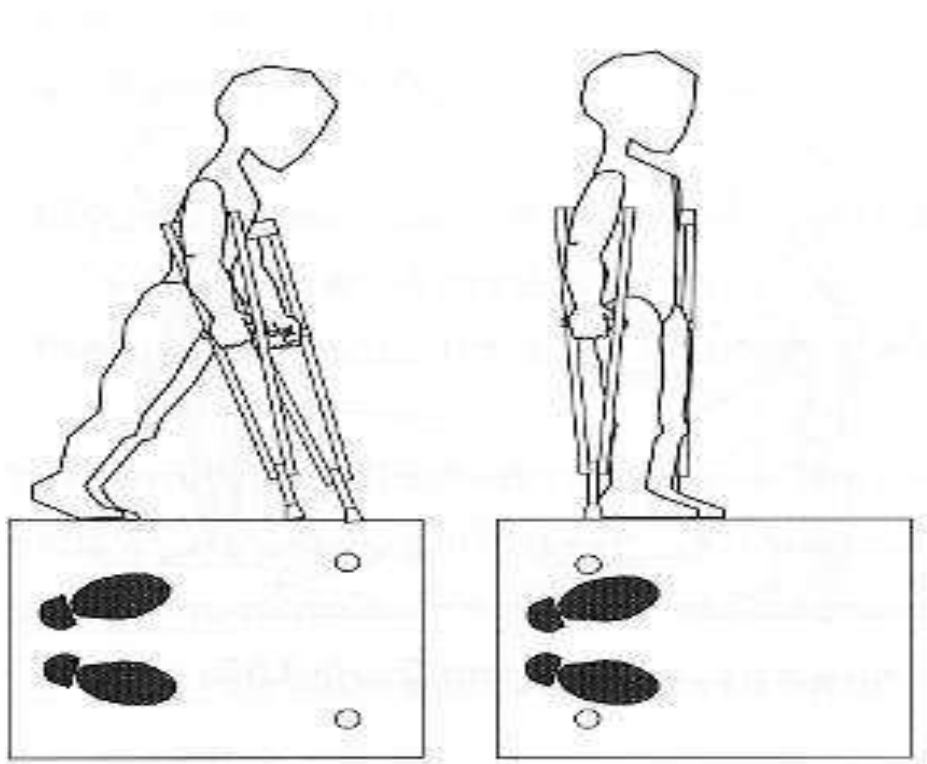
Swing-to gait

- Both crutches -> both lower limbs almost to crutch level
- The swing-to gait involves forward movement of both crutches and the lower extremities “swing to” the crutches.



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STAIR CLIMBING

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GUIDELINES

- If railing is available – use it (For axillary crutches, put both in one hand)
- Stronger LE always leads going up & weaker or involved limb leads coming down. (up with good; down with bad)

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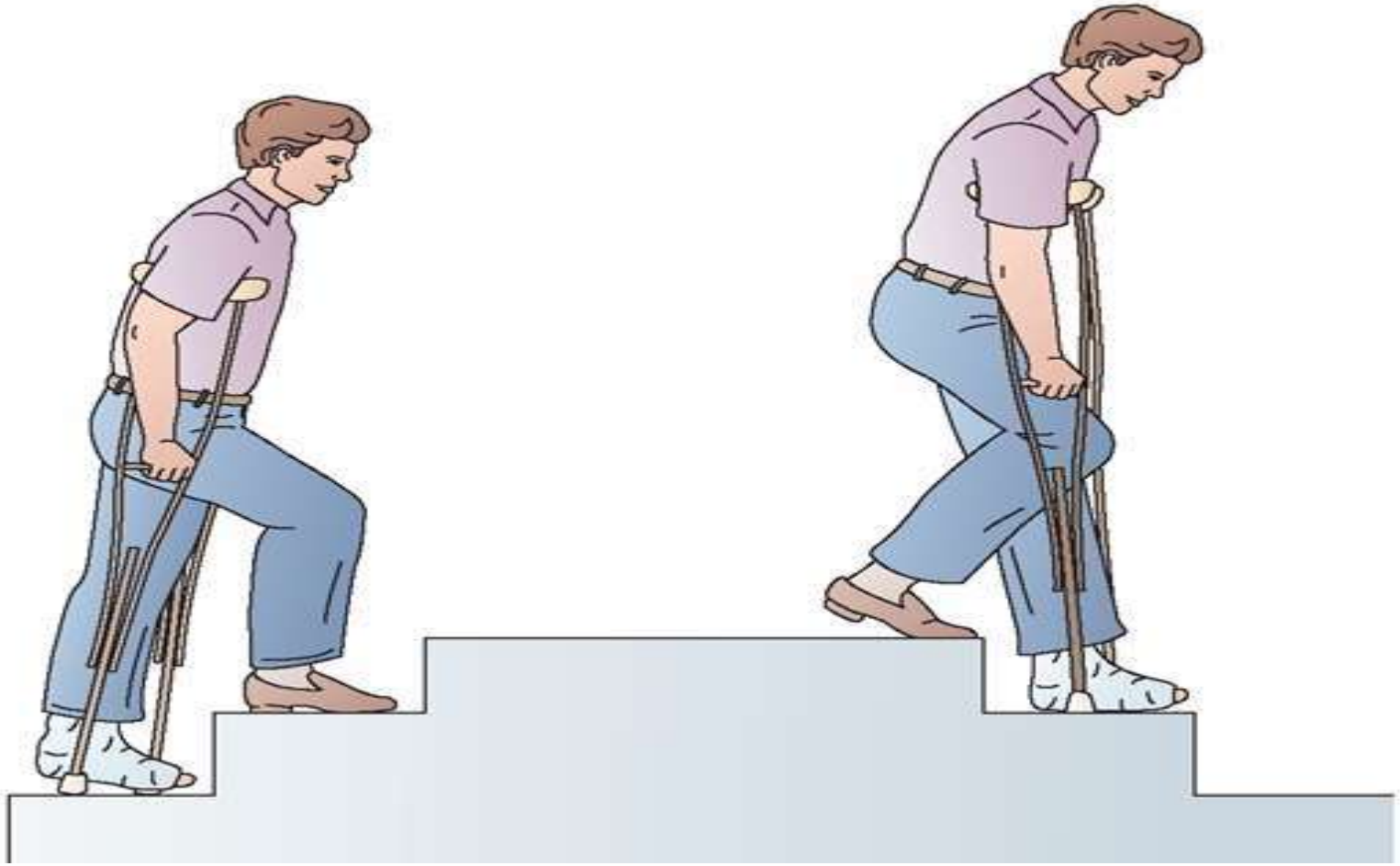
Stair Climbing
Up With GOOD, Down With BAD



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According to static and dynamic balance, starts from easy to hardest

Underwater

Use parallel bars

Walker

Crutches

Canes

Independent

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