

AMBULATORY AIDS AND GAIT TRAINING

Department of PMR

Ambulatory Aids

- ▶ Assistive devices for mobility/ambulation.
- ▶ Provide support and transmit body weight.

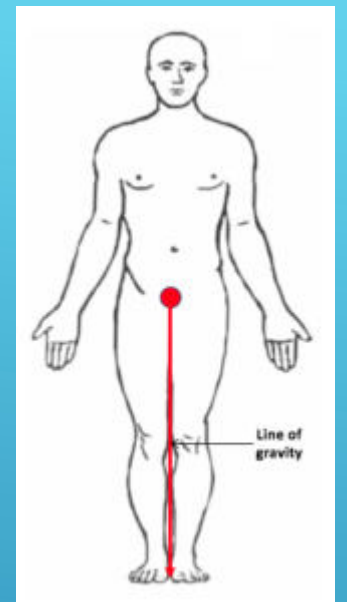
Types

- ▶ Canes
- ▶ Crutches
- ▶ Walkers



Whom to be given?

- ▶ who have difficulty maintaining their center of gravity within support area.
- ▶ It increases the area of support.



How it works?

- ▶ Improve balance
- ▶ Redistribute and extend the weight-bearing area
- ▶ Reduce lower limb pain
- ▶ Provide small propulsive forces
- ▶ Provide sensory feedback.

They should be considered an extension of the upper limb.

Pre-requisite for use

- ▶ Adequate upper limb strength and coordination
- ▶ Endurance
- ▶ Stability

An exercise program for the upper limbs and a supervised period of training program is recommended.

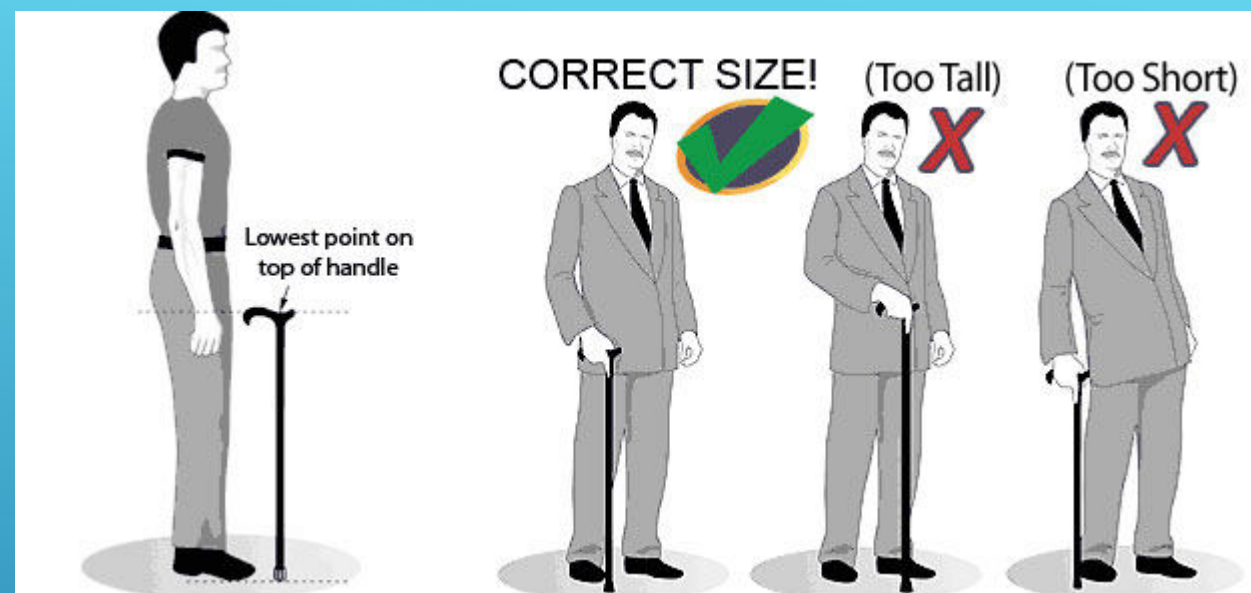
Which type of aid needed ?

Depends on how much balance and weight-bearing assistance is required.

- ▶ The body weight transmission -
- ▶ Unilateral cane - 20% to 25%
- ▶ Forearm or Arm cane - 40% to 50%
- ▶ Bilateral crutches - up to 80%.

Canes

Length Measurement –



- ▶ Tip of the cane at the level of the greater trochanter in an upright position.
- ▶ Elbow flexed approximately 20 degrees

~~Cane with height adjustable notches - “one cane fits all”~~

Canes

- ▶ **Parts - handle, shaft, and base**
- ▶ **Material – woods, metal especially aluminum, plastics, and carbon fibre.**
- ▶ **Types - C cane (crook top cane or J cane), Functional grip Cane, Quad cane**



Canes

- ▶ The cane usually is **held on the side opposite the affected leg.**
- ▶ The patient advances the cane and the affected foot, then moves the unaffected foot.

Crutches

Types -

- ▶ Underarm (Axillary)
- ▶ Forearm (Lofstrand)
- ▶ Canadian (Triceps crutch)
- ▶ Forearm support (Platform crutch)

Axillary crutch

- ▶ **Length:** anterior axillary fold to a point 6 inches lateral to the fifth toe with the shoulders relaxed.
- ▶ **Crutch handle :** elbow flexed 30 degrees, the wrist in maximal extension, and the fingers forming a fist, crutch 3 inches lateral to the foot.



Forearm (Lofstrand)

- ▶ Length: standing upright with elbow in 20 degrees of flexion.
- ▶ Less supportive than axillary crutches for ambulation.

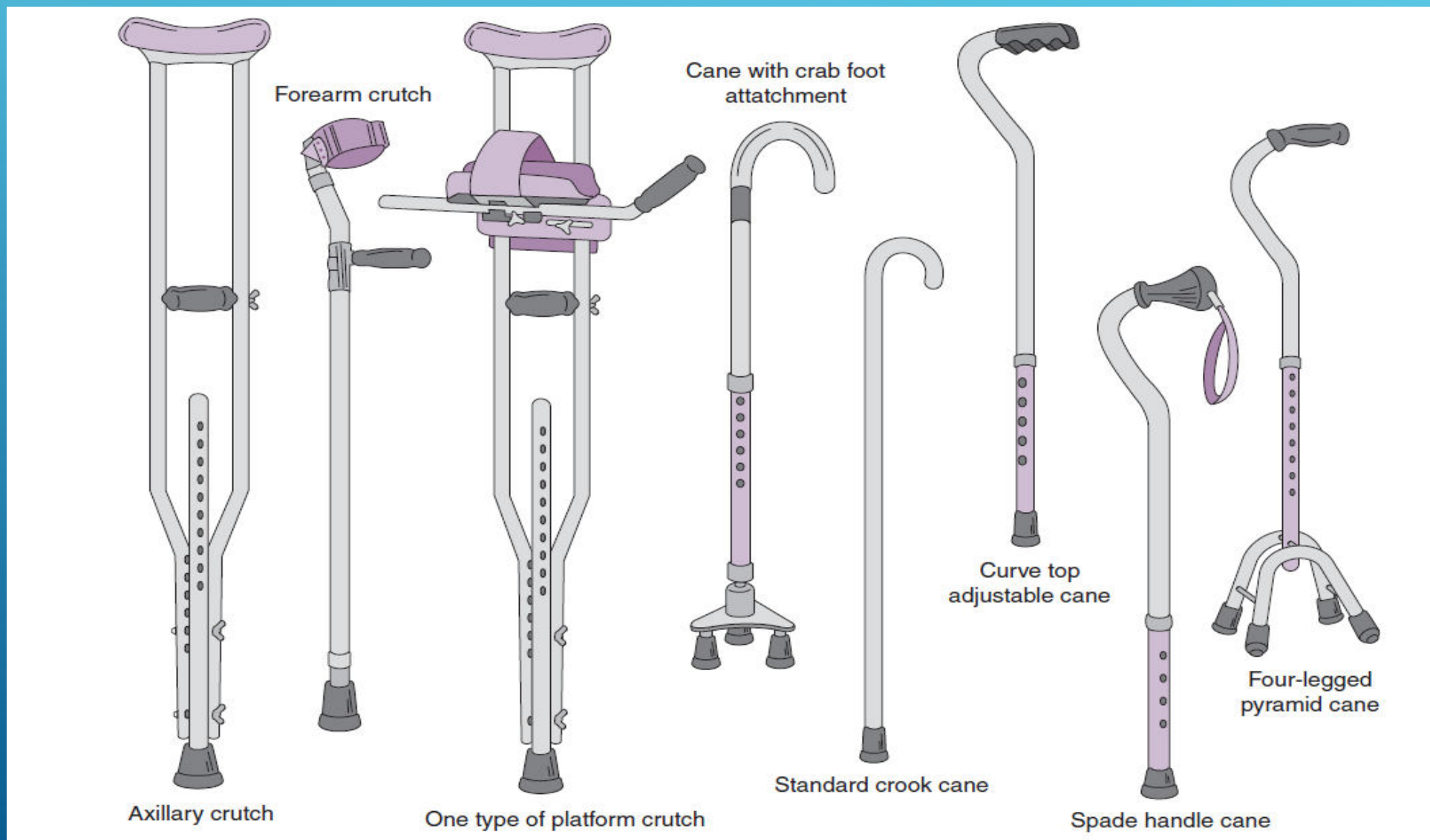


Platform Forearm Crutch

- ▶ Length: The distance from the ground to the forearm rest with the shoulders relaxed and the elbows flexed 90 degrees
- ▶ Indications - painful wrist & hand conditions, elbow contractures.



Commonly used crutches and canes



Walker

- ▶ Length: patient stand upright and the elbows flexed 20 degrees. Front of the walker 12 inches in front of the patient.
- ▶ Provides maximum support but a slow gait.
- ▶ Front wheels facilitate movement of the walker for those who lack upper limb coordination.
- ▶ Useful for hemiplegia and ataxia.



Walker types



Standard walker



Platform walker



Wheel walker



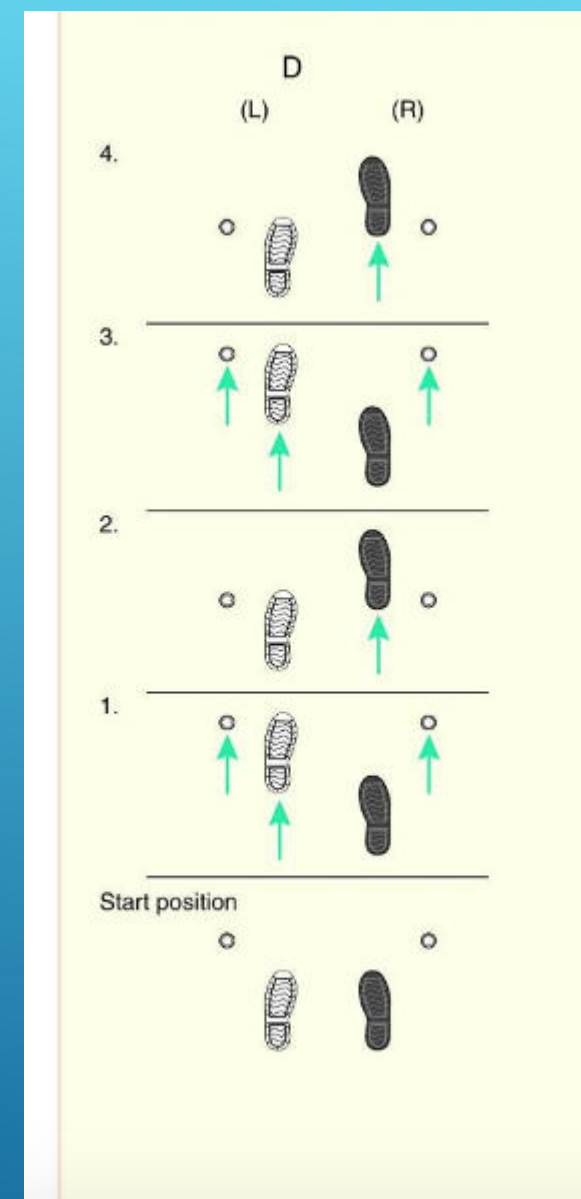
Reverse walker

Gait Patterns

- ▶ Foot sequence of an individual using assistive devices.

Gait pattern depends upon ability to-

- ▶ Move the feet reciprocally
- ▶ Tolerate full load on each leg
- ▶ Lift the body off the floor
- ▶ Maintain the balance



Gait Patterns

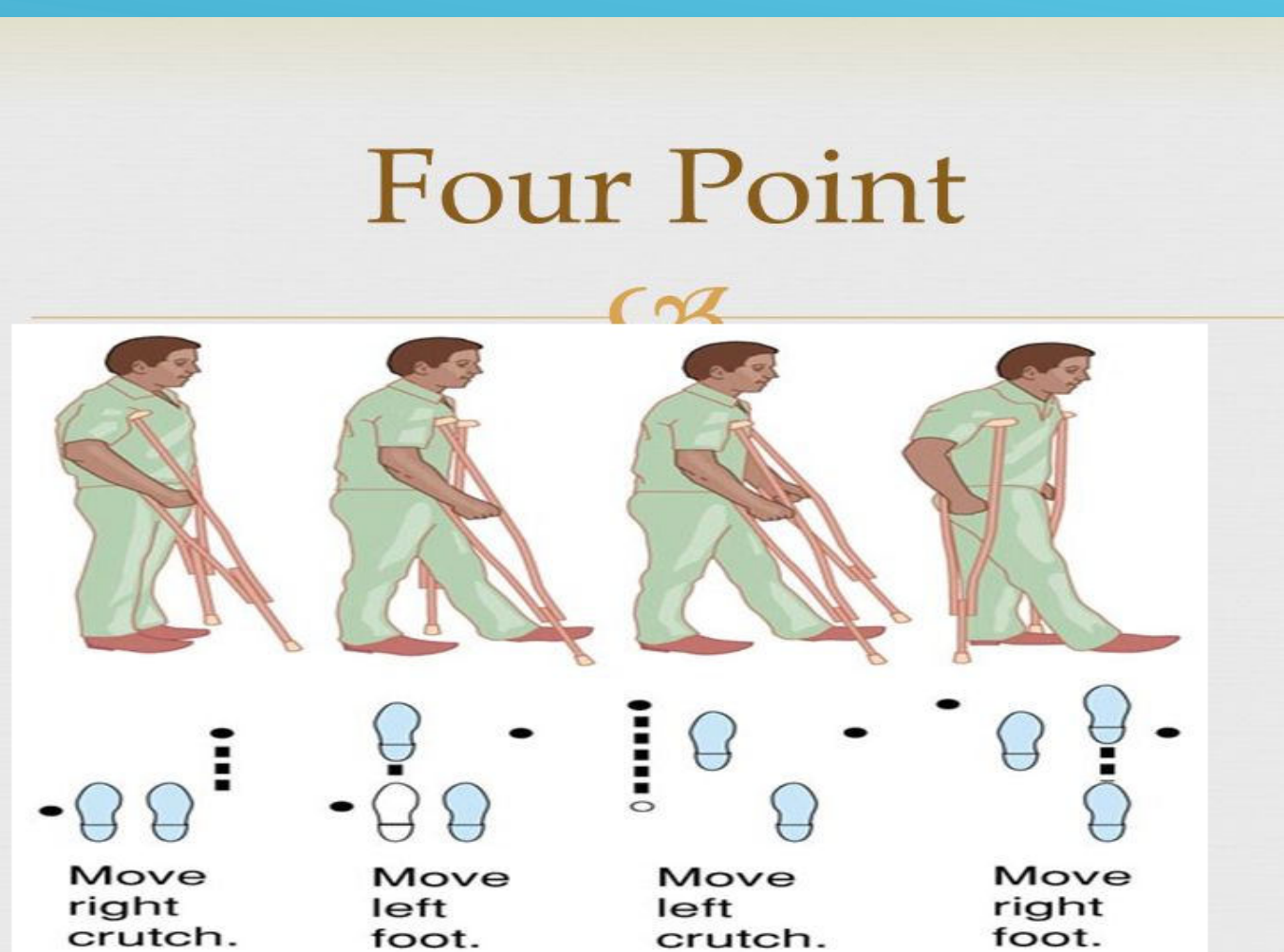
□ Alternating (reciprocal) gait pattern

- ▶ Four-point gait
- ▶ Two-point gait
- ▶ Three-point gait

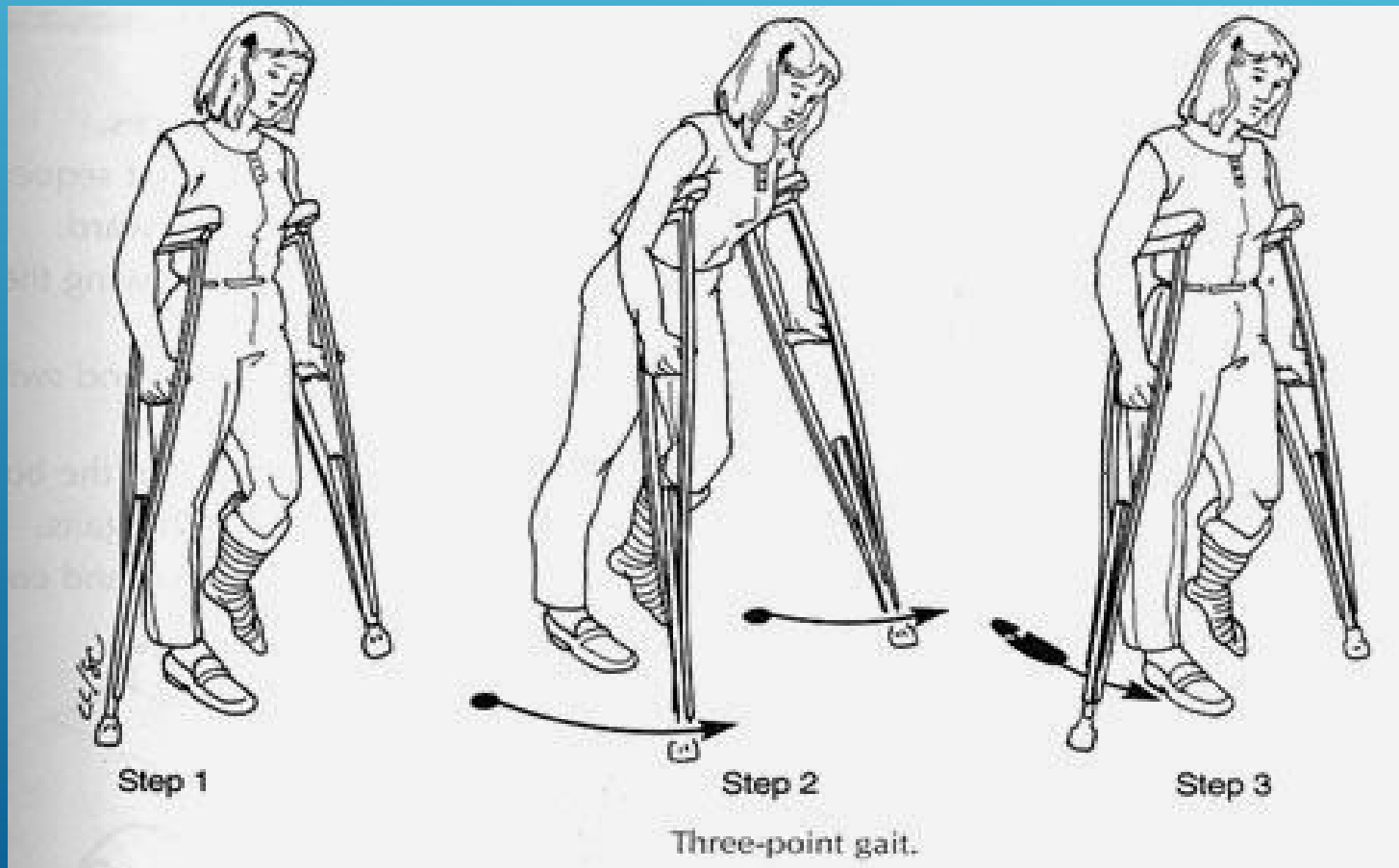
□ Swinging (simultaneous) gait pattern

- ▶ Swing-to gait
- ▶ Swing-through gait

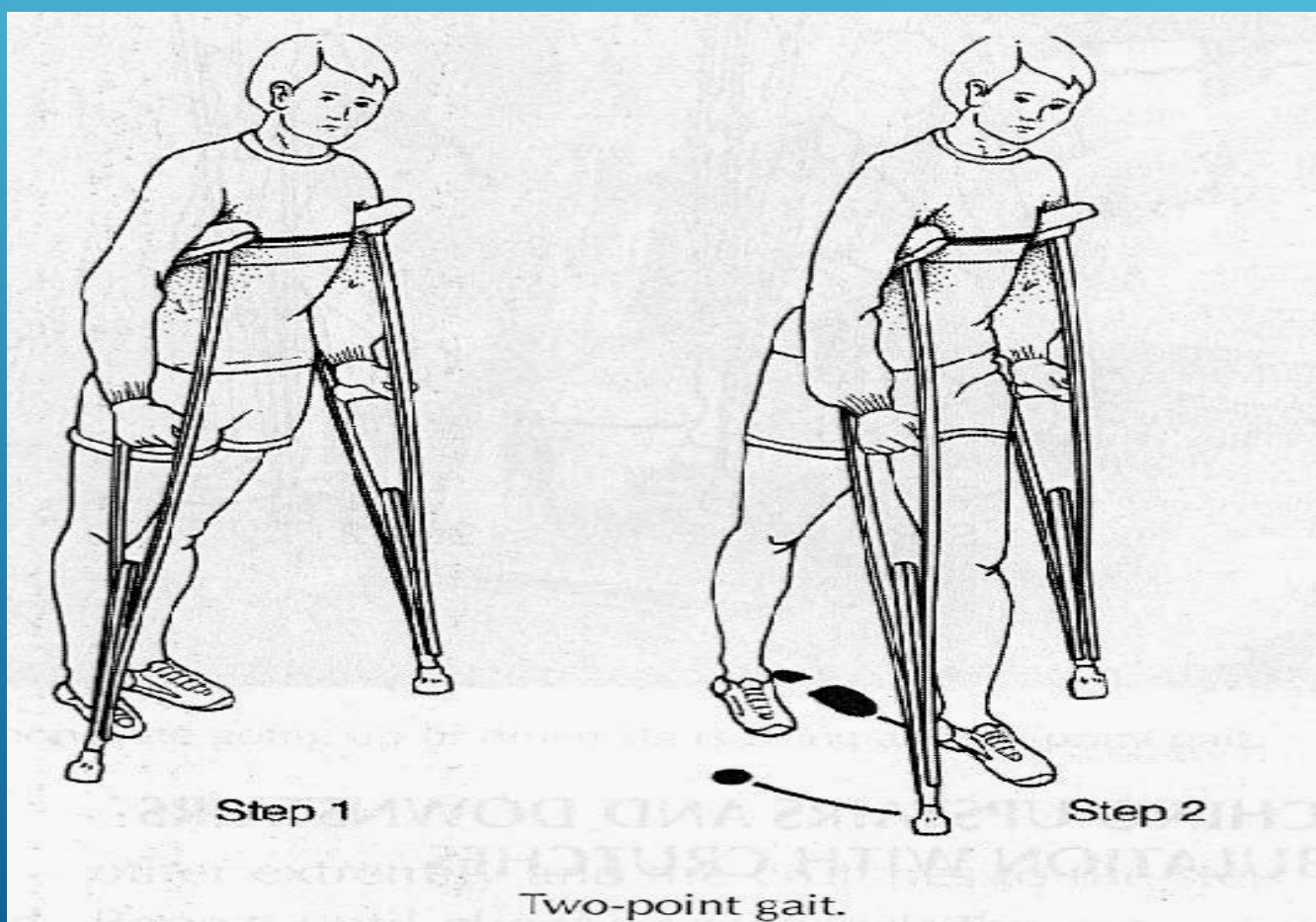
Four-point Gait



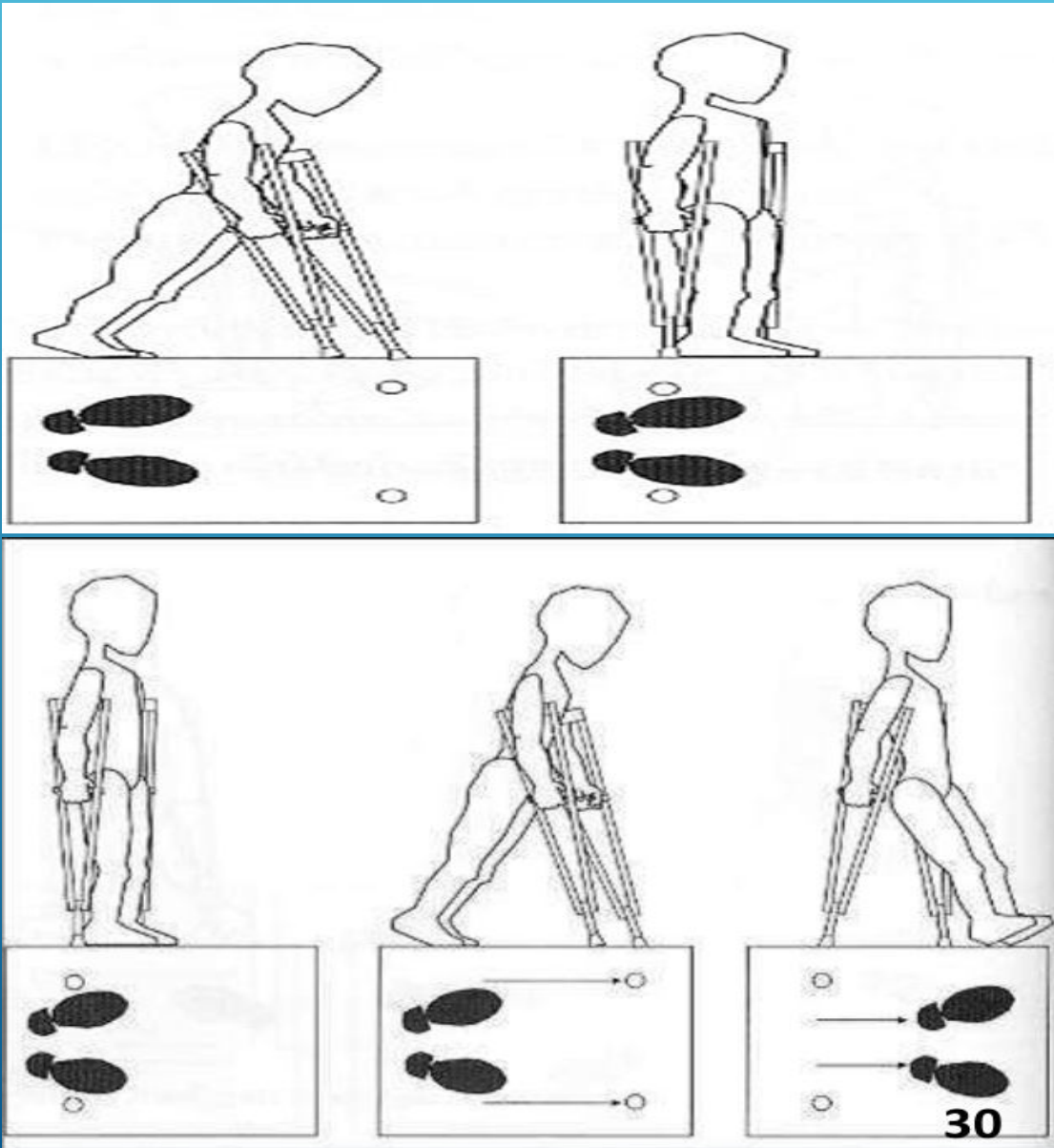
Three-point Gait



Two-point Gait



Swinging (Simultaneous) Gait Pattern



Swing-to gait

Swing-through gait

AMPUTATION - GAIT TRAINING

Amputation - Gait Training

Steps:

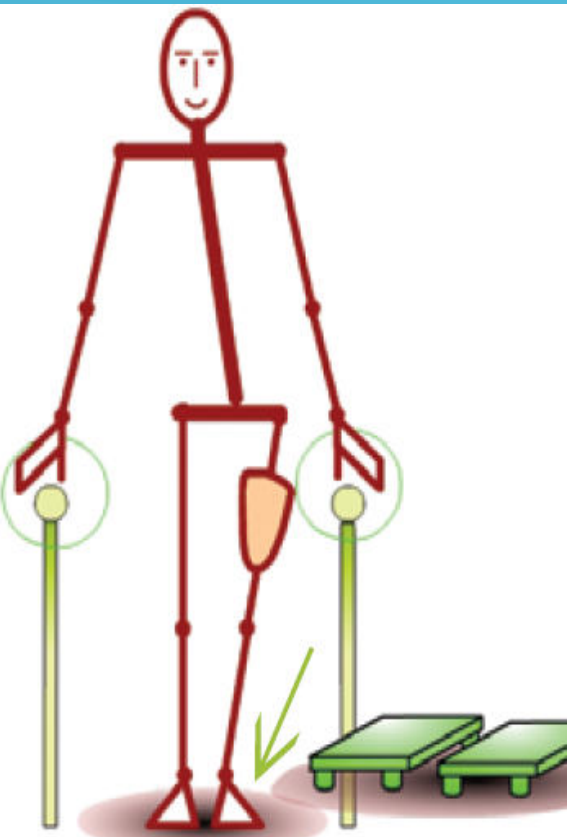
- a) **Weight-bearing and balance training**
- b) **Basic Gait training**
- c) **Advance gait training**
- d) **Functional training**



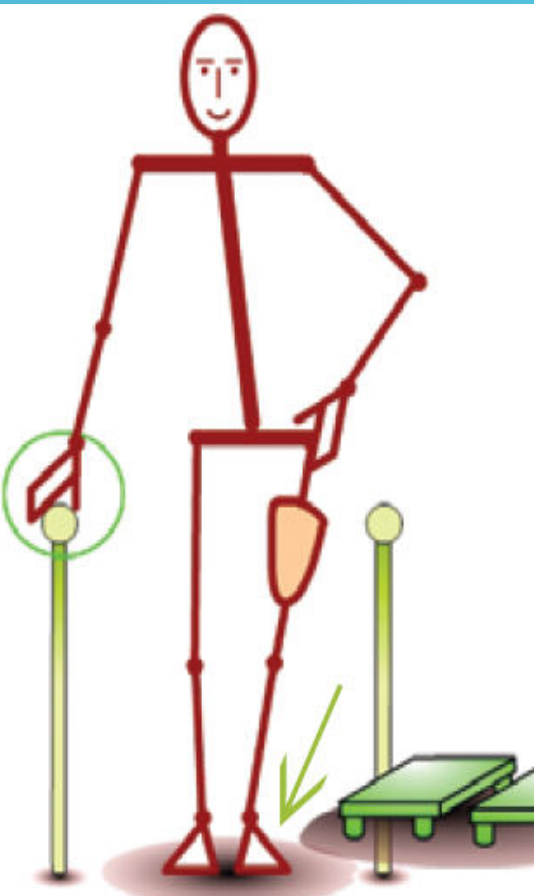
Weight Bearing and Balance

1. **Partial weight bearing (with & without support)**
2. **Partial weight shift (with & without support)**
3. **Pelvic rotation training**
4. **Sideward walking (two-hand support)**
5. **Full weight shift (with & without support)**
6. **Heel strike (with or without support)**
7. **Handball (with or without support)**

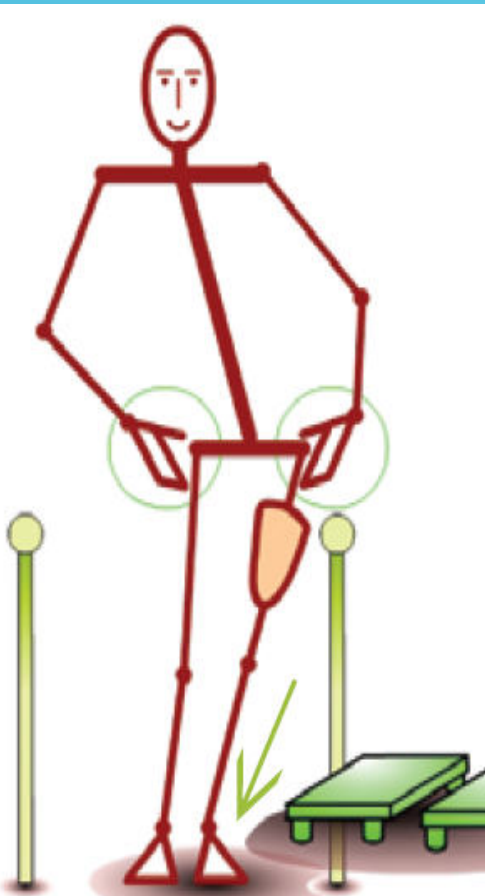
Partial Weight Bearing



Shift the body weight from the sound leg to the prosthesis (a pair of scales may be useful to measure the weight shifted).

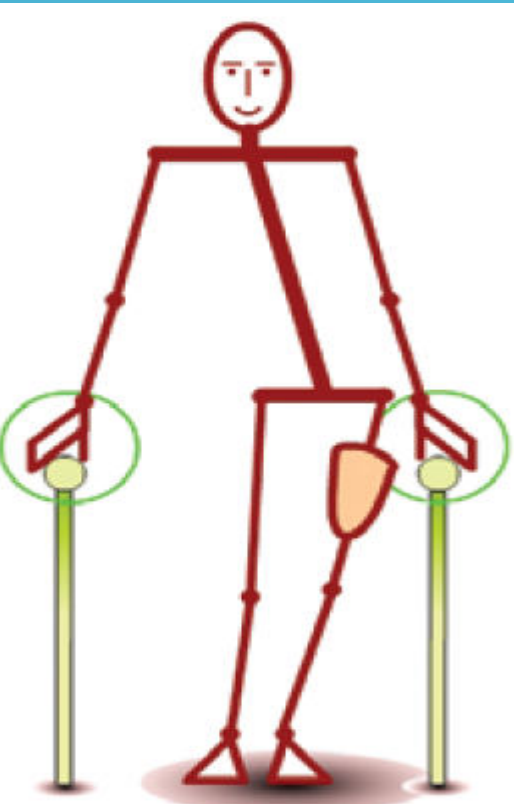


Shift the body weight from the sound leg to the prosthesis. Always use the contralateral hand.

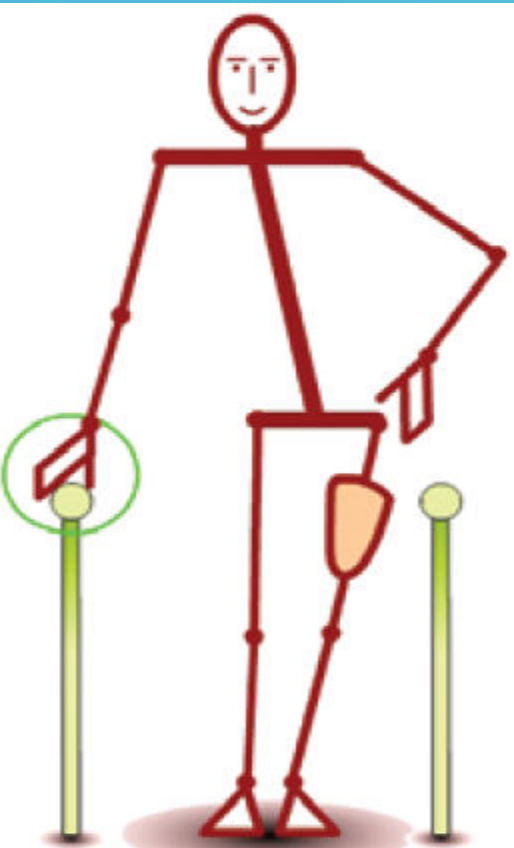


Shift the body weight from the sound leg to the prosthesis.

Partial Weight Shift



Shift the pelvis from right to left and vice versa, without moving your shoulders.



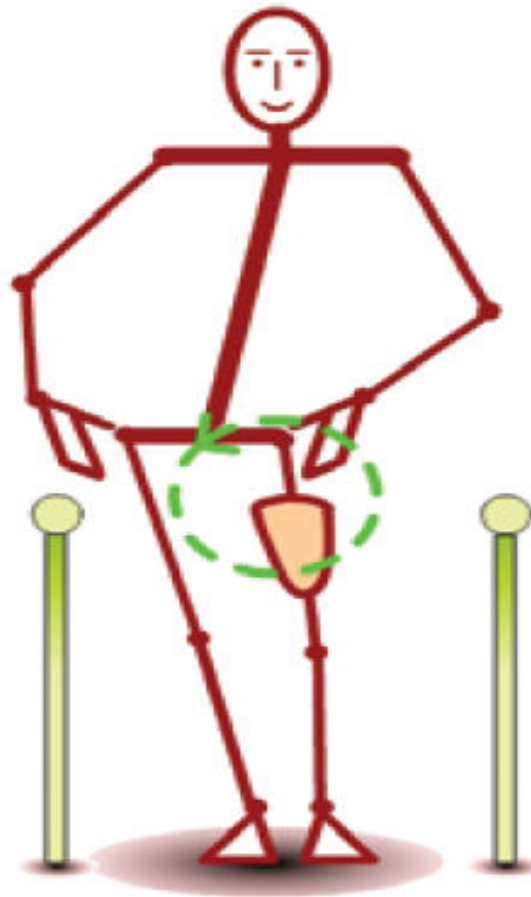
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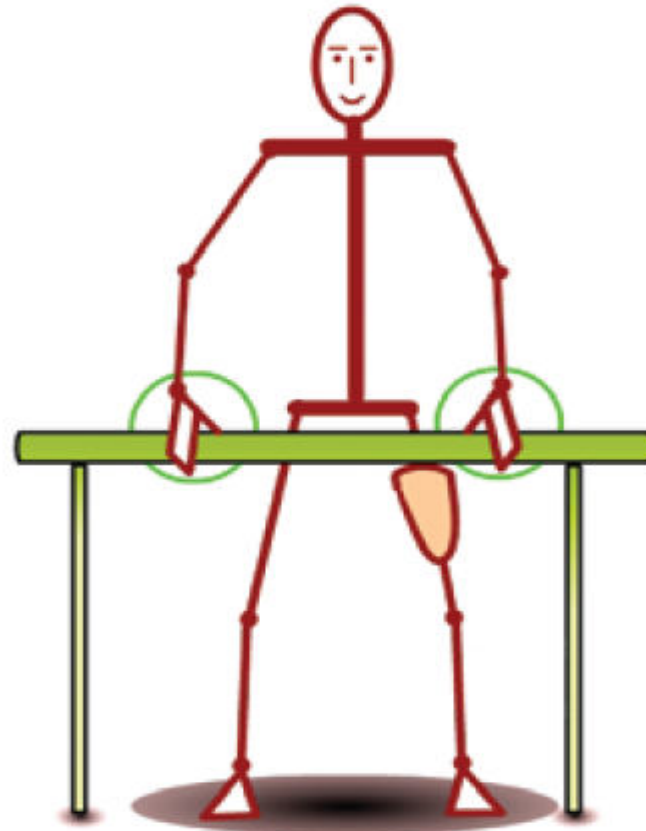


Shift the pelvis from right to left and vice versa, without moving your shoulders.

Pelvic Rotation Training & Sideward Walking

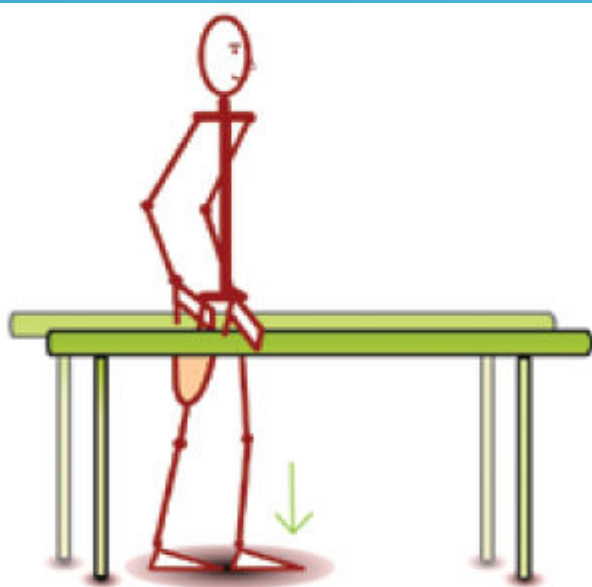


Rotate the pelvis.



Walk sideways towards the prosthetic side and back.

Full Weight Shift



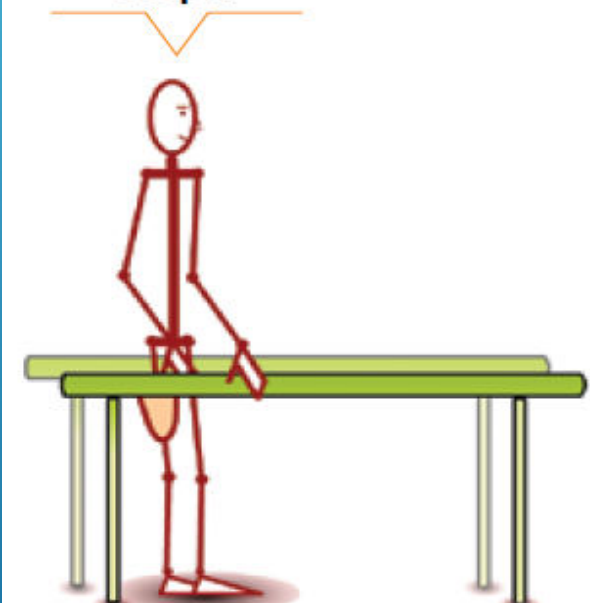
Shift the body weight from one leg to the other by moving the pelvis and trunk from front to back, with or without the support of your arms.



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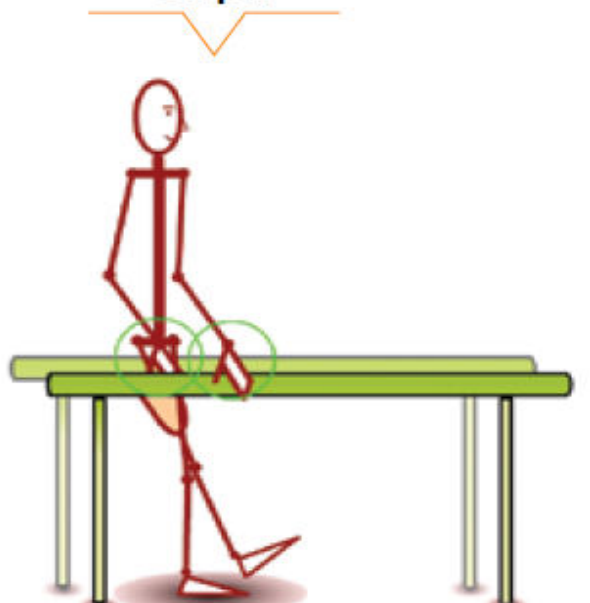
Heel Strike

Step 1



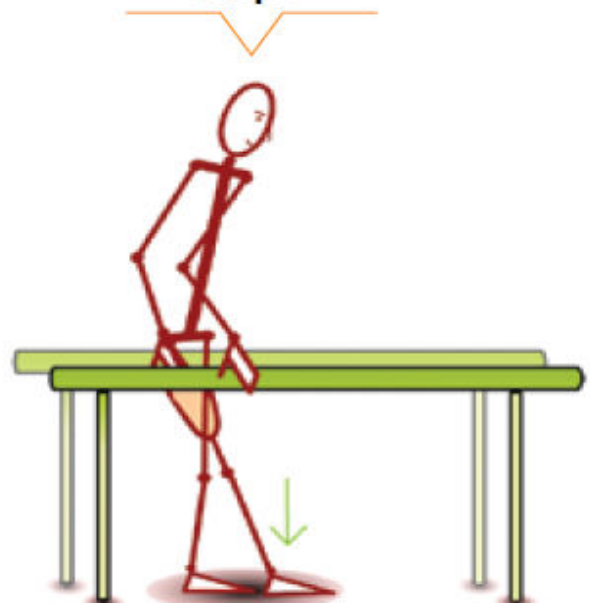
Stand between the parallel bars with or without the support of your hands.

Step 2



Step forward with the prosthesis.

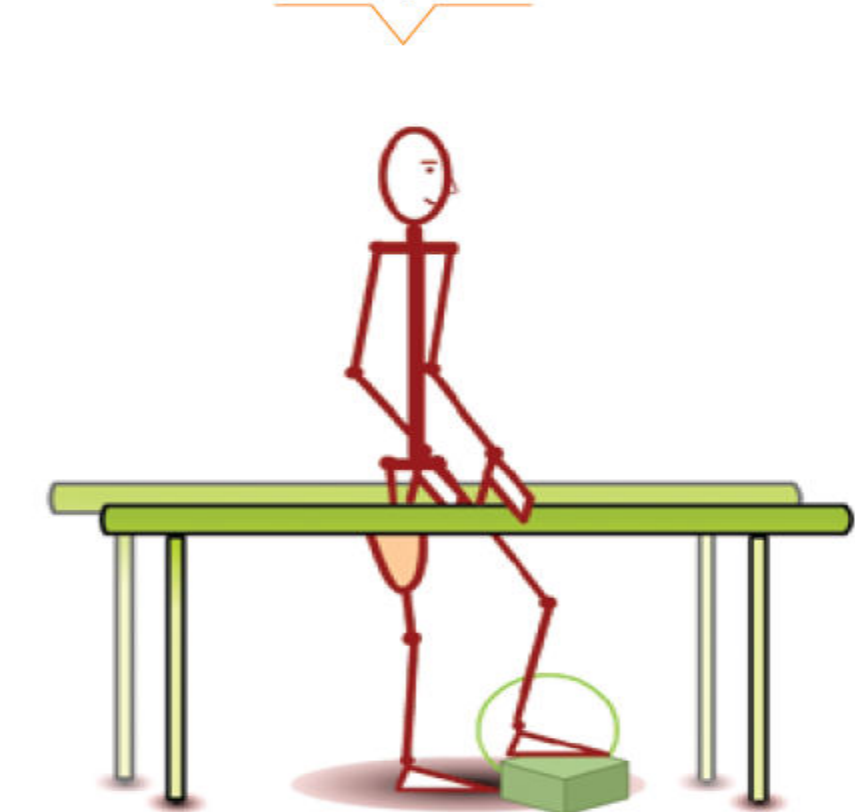
Step 3



Keep the knee joint straight and push the heel downwards.


Handball

Step 1



Stand between the parallel bars with or without support; place the sound leg on a raised object.

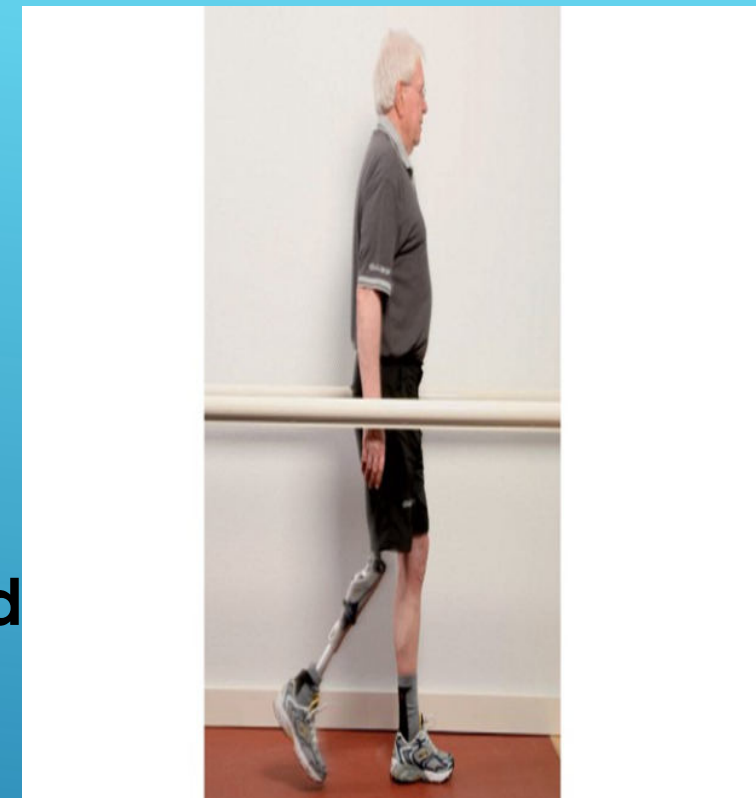
Step 2



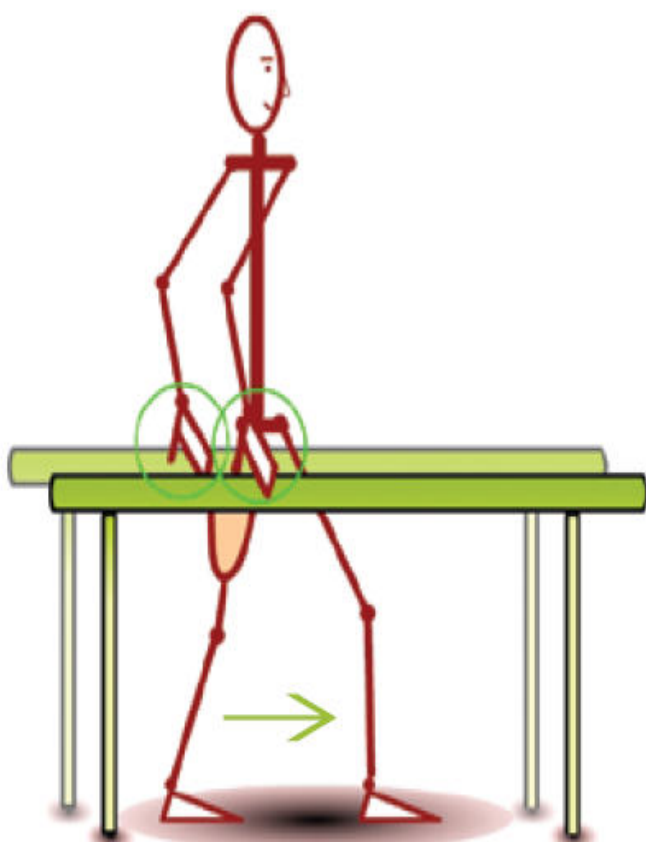
Play catch with the instructor.

Basic Gait Training

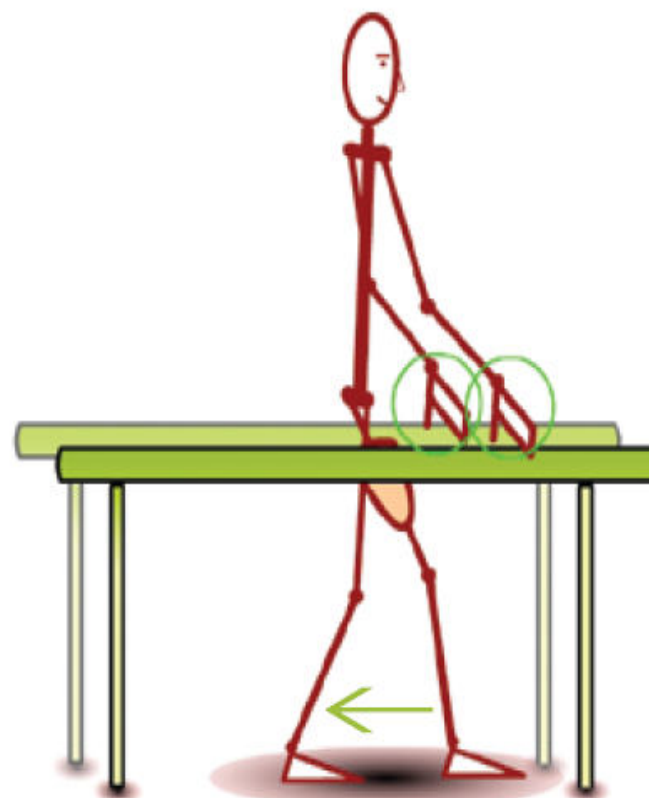
1. Sound-leg step forward & backward (two-hand support)
2. Sound-leg step through (with & without support)
3. Prosthetic-leg step forward & backward (two-hand support)
4. Prosthetic-leg step through (two-hand support)
5. Prosthetic-leg step forward (one-hand support)
6. Prosthetic-leg step through (without support)
7. Walking between the parallel bars (with & without support)



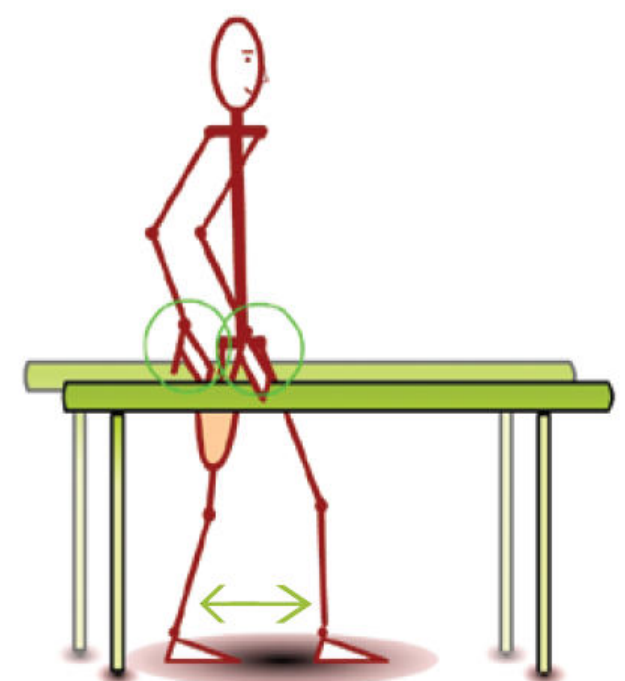
Sound-leg Steps



Step forward with the sound leg, keeping hands parallel to the prosthesis.

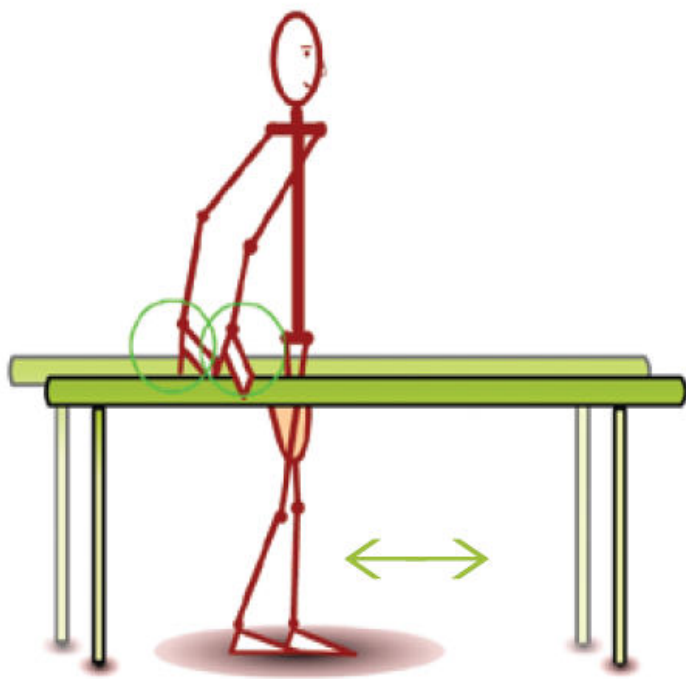


Step backward with the sound leg, keeping hands parallel to the prosthesis.
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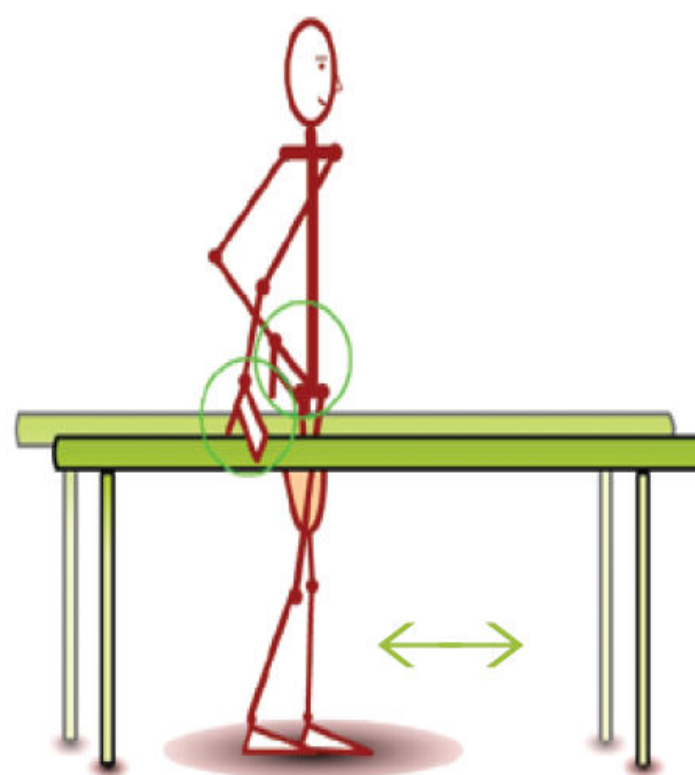


Step forward and backward with the sound leg, keeping hands parallel to the prosthesis. Hold the prosthesis slightly in adduction. Maintain an upright position, allowing the trunk and shoulders to move backward and forward, but without lateroflexion.

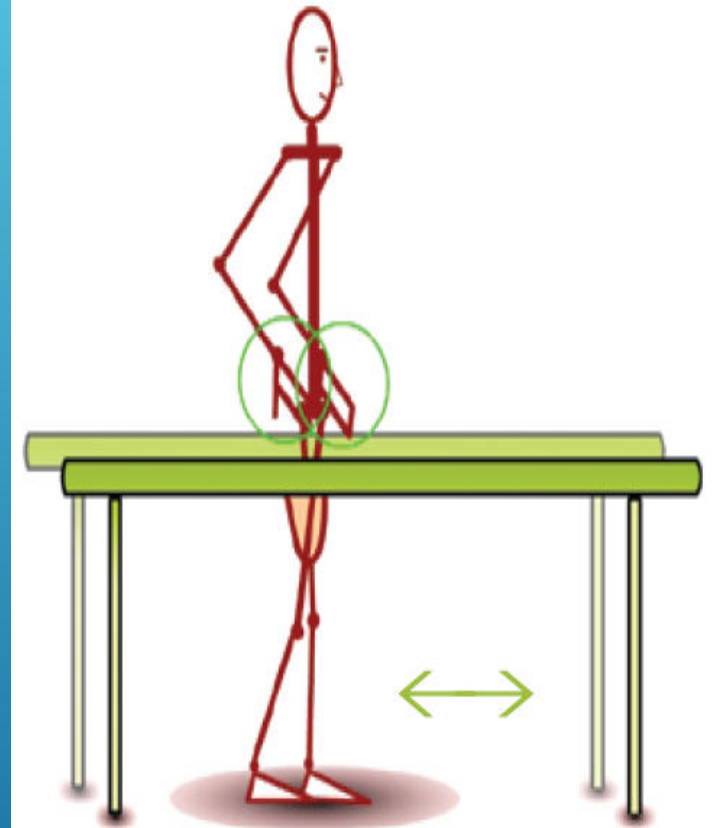
Sound-leg step through



Step forward and backward with the prosthesis, keeping hands parallel to the sound leg and holding the prosthesis slightly in adduction. Maintain an upright position, allowing the trunk and shoulders to move backward and forward, but without lateroflexion.

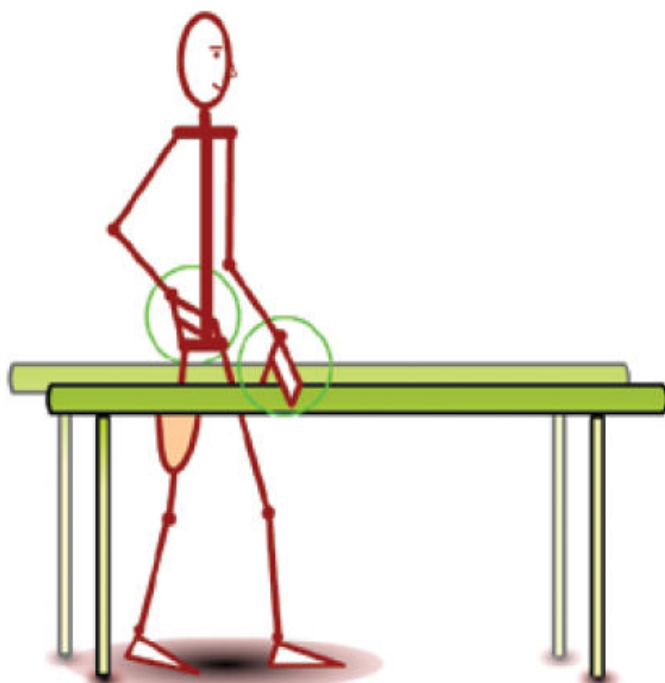


Step forward and backward with the prosthesis. Always use the contralateral hand.

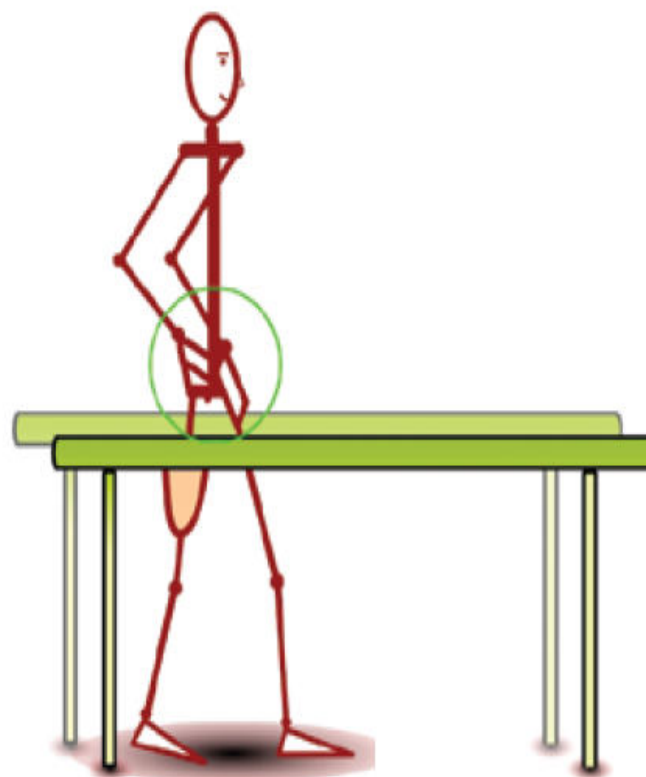


Step forward and backward with the prosthesis.

Walking between the parallel bars



Walk between them using one hand to support yourself. Always use contralateral hand. No lateroflexion of the trunk or uneven step length.



Walk between them without support. No lateroflexion of the trunk or uneven step length.

Thank You

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