WALKING AIDS AND GAIT TRAINING

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Walking is the manner or way in which you move from place to place with your feet.
Gait is the process or components of walking.

Gait: -
Gait cycle is also called stride, it is the activity that occurs between the
time one foot touches the floor and the time the same foot touches the floor again.

Stride Length: -
It is a distance traveled during the gait cycle.

Step: -
It is basically one-half of a stride. It takes two steps (a right and a left
one) to complete a stride or gait cycle. These steps should be equal.

Step Length: -
It is that distance between heel strike of one foot and heel strike of the
other foot.

Cadence: -
Walking speed, or cadence, is the number of steps
taken per minutes.
(Slow walking may be as slow as 70 steps/min,
While 130 steps/min is fast walking)

There are two phases of gait cycle.
   a. Stance Phase
   b. Swing Phase

➢ Stance phase accounts for 60% of gait cycle.
➢ Swing phase accounts for 40% of gait cycle.
Walking Aids:

Walking aids are assistive devices for rehabilitation of walking/gait abnormalities.

Walking aids are useful to assist people who have difficulty in walking or people who cannot walk independently. These include:

1. Crutches,
2. Sticks, &
3. Frames

1. Crutches:

These are used to reduce weight bearing on one or both legs and also give support where balance is impaired and strength is inadequate.

Types of Crutches:

a. Axillary crutches:

They are made of wood with an axillary pad, a hand piece and a rubber ferrule. The position of the hand piece and the total length are usually adjustable. The axillary pad should rest beneath the apex of axilla and hand grip in slight flexion when weight is not being taken. When weight is being taken through axillary pad, the elbow will go into extension and weight is transmitted down the arm to hand piece.

Measurement of length:

It is done with the patient in lying position.

a. With shoes off - It is measured from the apex of the axilla to the lower margin of the medial malleolus. This is any easy measurement and is reasonably reliable.

b. With shoes on - It is measured 5cm down from the apex of the axilla to a point 20cm lateral to the heel of the shoe. This is tends to be less accurate than the first method.

The measurement from the axillary pad to the hand grip should be taken with the elbow slightly flexed (approximately 15°) from a point 5cm below the apex of the axilla to the ulnar styloid. Once the patient is standing with the support of the crutches, the physiotherapist must guide to use the correct way to use the crutches that they do not allow the axillary pad to press into the axilla.
**b. Elbow crutches:**

They are made of metal and have a metal or plastic forearm band. They are usually adjustable in length by means of a press clip or metal button and have a rubber ferrule. These crutches are suitable for patients with good balance and strong arms. Weight is transmitted exactly the same way as for axillary crutches.

**Measurement of length:**

The measurement is usually taken with the patient in the lying position with the shoes on. The elbow is slightly flexed (approximately 15°) and the measurement is taken from the ulnar styloid to a point 20cm lateral to the heel of the shoe. Once the patient is standing with the support, the length must be checked.

**c. Forearm crutches (gutter crutches):**

They are made of metal with a padded forearm support and strap, an adjustable hand piece and a rubber ferrule.

These are used for patients with rheumatoid disease for providing support. They cannot take weight through hands, wrists and elbows because of deformity or pain.

**Measurement of length:**

a. If the patient is able to stand, it is better to assess the required length in this position from elbow to the floor.

b. Measurement can be carried out with the patient lying with shoes on, and is taken from the point of the flexed elbow to 20cm lateral to the heel.

A patient with Rheumatoid Disease may allow the hips and knees to flex in the weight-bearing position because of muscle weakness and/or pain, but with gutter crutches for support he may be able to obtain more extension. This must be taken into account in any adjustment.

**Preparation for crutch walking:**

a. **Arms:** shoulder extensors, adductors and elbow extensors 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 and mobility to grasp hand piece.

b. **Legs:** the 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.

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

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

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

![Diagram of crutch walking in non-weight bearing](image)

ii. 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.

![Diagram of crutch walking in partial weight bearing](image)
2. Sticks:

Sticks may be made up of either wood or metal with curved or straight hand piece. Metal ores are adjustable while the wooden ones are non-adjust-able.

**Measurement of length:**

The measurement can usually be taken with the patient in standing position. The elbow is slightly flexed and the measurement is taken from the ulnar styloid to the floor approximately 15cm from the heel.

**Uses:** Sticks allow more weight to be taken through the leg than crutches. One stick may be used on the unaffected side, so that the stick and affected leg are placed forward together, taking some of the weight through the stick.

**Tripod or quadripod:**

Metal sticks with three or four prolonged bases and gives more stable support than stick.

3. Frames:

They are light weight with four feet which can be adjustable in height. Patient lifts the frame forward then leans on it and takes steps. The patient should take even steps, keeping the frame forward. Rotator frames which can be pushed or reciprocal frame where each side moves independently are useful for ataxic patients.
Ataxic patients who are too unsteady to lift a frame forward may be able to use a rollator frame which can be pushed or a reciprocal frame where each side moves independently.

Safety: The physiotherapist must check the safety of all walking aids not only when giving to them to a patient, but regularly throughout the treatment program.