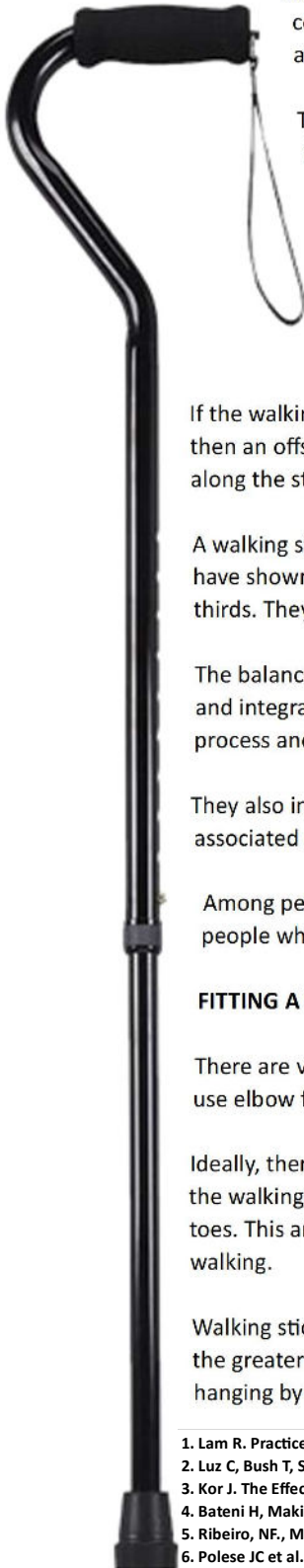


Walking Sticks and Mobility



Gait disturbances can be divided into 3 useful categories: balance (including sensory and cerebellar systems), motor (including cerebral initiation of walking and muscular strength), and joint/skeletal problems ¹.

The standard walking stick is generally used for mild sensory or coordination problems found in visual, auditory, vestibular, peripheral proprioceptive, or central cerebellar disease. It can help stabilise a patient's gait by providing an extra contact point with the ground, therefore, increasing the base of support ¹.

These devices increase stability by widening the base of support, reducing the weight load on lower extremities, and providing input related to the body in relation to the environment ².

If the walking stick is required to bear weight, such as for Clients with osteoarthritic hip or knee pain, then an offset walking stick could provide greater stability, as it allows force to be placed directly along the stick's shaft.

A walking stick is generally advanced in unison with and on the side opposite the affected leg. Studies have shown that use in this way reduces force on the leg opposite the walking stick by almost two-thirds. They can easily support up to 15% to 20% of a patient's body weight ¹.

The balance ability during gait requires musculoskeletal control, biomechanical factor, neural process and integration of sensory information. In the unstable state, postural control needs more complex process and usage of more muscles and muscle activation than in stable state ³.

They also increase a sense of security and safety which leads to a reduction in falls risk and is directly associated with fewer falls and fall injuries ².

Among people who fall at home, most do not have an assistive device with them when they fall and people who do not have their device with them when they fall sustain more severe injuries ².

FITTING A WALKING STICK

There are various ways of fitting a walking stick, but most Therapists use elbow flexion as a guide.

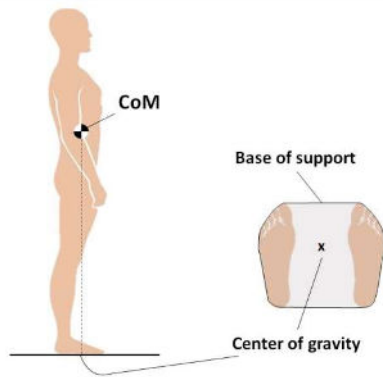
Ideally, there should be 20° to 30° of flexion in the elbow when holding the walking stick tip approximately 15 cm from the lateral border of the toes. This amount of flexion allows for efficient elbow movement while walking.

Walking stick length should be roughly the distance from the ground to the greater trochanter or wrist crease when the patient's arm is hanging by their side ¹.



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BASE OF SUPPORT



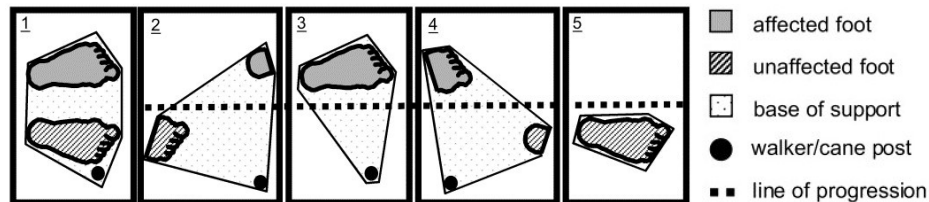
The base of support (BOS) refers to the area beneath an object or person that includes every point of contact that the object or person makes with the supporting surface.

The centre of gravity (COG) is a point which the centre of mass (COM) comes down perpendicularly to the BOS. Stable posture means that the COG is placed within the BOS 3.

In the standing position, the BOS is the area within the feet. So, the postural stability is increased when the BOS is widened by feet 1. The narrower the base, the lesser stable postural stability 3.

During gait the body is in a continuous state of imbalance, with each subsequent step preventing a fall. Gait balance is maintained by regulating the interactions between the COM and BOS.

The use of a walking stick not only increases BOS in standing, but more importantly increases BOS during single leg stance during gait. Utilised on the contralateral side to the affected leg, the BOS is widened, and the COG no longer has to come directly over the small base of the affected leg. This offers benefit for stability but also in reduced force through that leg.



4

GAIT PATTERN

With ageing humans tend to walk slower, with shorter steps and longer stance phases. To increase stability, there is an increase in the time that both feet contact the ground 7. This is in an effort to maximise duration of a larger BOS. Use of a walking stick can improve these gait parameters, provide better balance and support during gait 7.

The use of a walking stick results in increases in speed during both fast and comfortable walking but did not result in changes in maximum joint angles. This also led to increases in power generation of ankle plantar flexion, knee extension, and hip flexion, without increasing the work of walking 6.

