

WalkAide set up: Getting the best stimulation and motor response

- **Setting up the patient:**

- **Fit the patient with the Biflex cuff first, before applying electrodes.**

Place the flat part of the cuff against the proximal, medial Tibia as it flattens into the Tibial Plateau. Find the location where the cuff has the best contact to the leg surface. This location usually puts the top edge of the cuff just below the patella. The orange indicator mark (★) should align with the crest of the tibia.



Once the cuff is fit, slide it out of the way to clear the area for electrode placement. Connect the electrode lead cables to the electrodes.

- **Finding proper electrode placement**

The optimal WalkAide setting produces the most functional lift of the foot at the lowest intensity setting. Proper electrode placement is the key to optimal stimulation of the Common Peroneal Nerve (PN). The ideal motion is a balance of pure anatomical dorsiflexion and eversion.

*The Superficial branch of the PN supplies the Peroneus Longus and Brevis, both *evert* the foot.

*The Deep branch of the PN supplies the Anterior Tibialis (which *dorsiflexes and inverts* the foot), the Extensor Hallucis Longus (which *extends* the big toe), and the Longus (which *extends* the other four toes). Both the Extensor Hallucis and Extensor Digitorum muscles can assist in dorsiflexion.



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o Electrode placement: Basics

The **BLACK** electrode is most commonly placed slightly posterior and distal to the head of the fibula; in the area of the Common Peroneal Nerve before it splits into Superficial and Deep branches. (Note: placement of the BLACK electrode can vary; at times the best spot is anterior very near or on the Anterior Tibialis muscle, sometimes placement is more posterior closer to the popliteal fossa. Start near the fibula but don't hesitate to move the electrode around if the response is not optimal.

Align the **RED** electrode along the path of the Deep branch as it dives into the Anterior Tibialis muscle. Place the red electrode on the thickest part of the Anterior Tibialis muscle; just lateral to the Tibial crest.

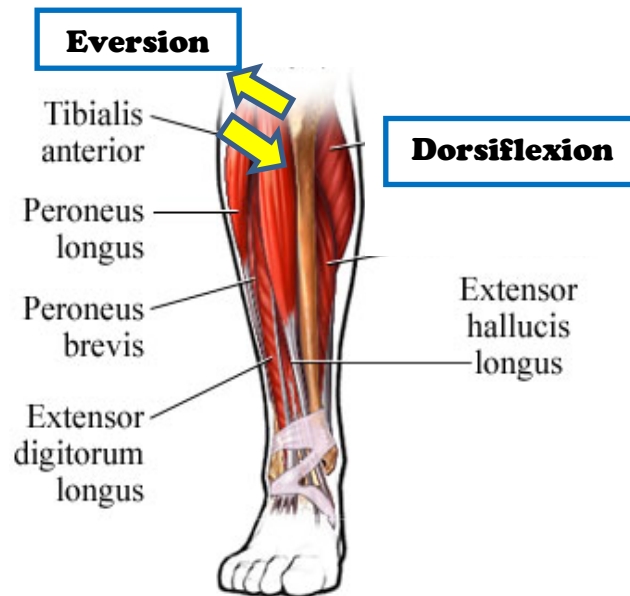


It may be difficult to isolate dorsiflexion at first; eversion is strongest because the Superficial branch is nearest the skin surface. (Note: Sometimes nerves and muscles need to “warm up” to get the best response. If the first response is only eversion no matter how you adjust the electrodes, let the patient sit in exercise mode with that placement for 5-10 minutes. When you try again you may more easily find a good, balanced response.)

Placement Tips: BLACK electrode - Find the spot where the response is greatest (whether it is eversion or dorsiflexion or both) and leave the electrode there.

RED electrode – generally moving the RED electrode **laterally and proximally** increases eversion (electrode is moving closer to the Superficial branch). Moving it **distally and medially** increases dorsiflexion (electrode is moving closer to the Deep branch and is more likely to recruit the assistance of the toe extensors). Adjust the RED electrode position to get the best response.

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- **Remember:** spacing the electrodes farther apart drives the stimulation deeper into the tissues; spacing them closer makes the stimulation more superficial. Take patient's leg size into account.

- **Other electrode tips:**

*Clean the skin of oils, soap residue or lotions.

*Always wet the electrodes or skin slightly. Dry electrodes do not conduct the electricity as well.

*Keep the skin *between* electrodes dry.

*Apply pressure to the electrodes as you test the stimulation to reproduce the pressure from the cuff.

If you have to: Push very hard on the electrodes to get a good response
Turn the WalkAide intensity way up
OR Cannot reproduce the response when the patient tries to don the cuff

You probably need to search for a better electrode placement.

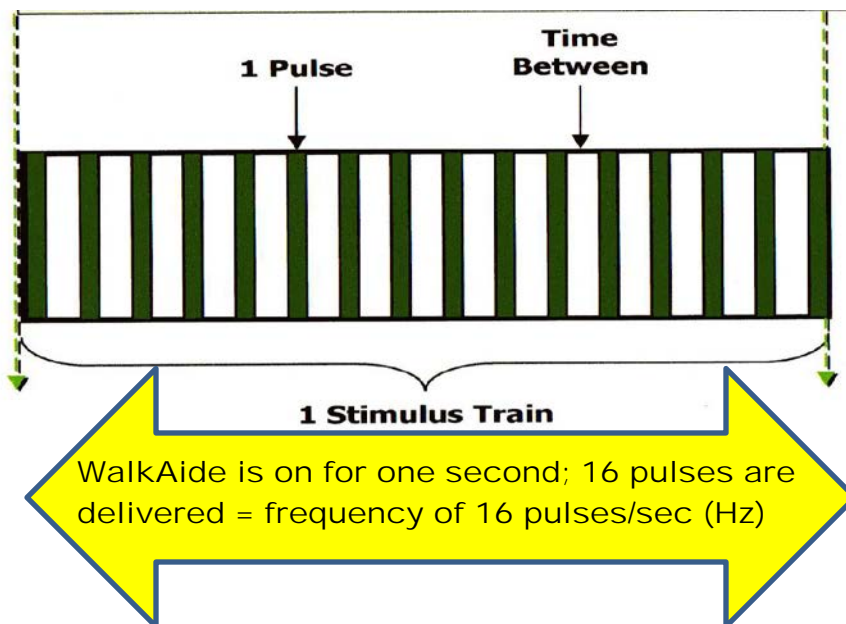
Position the cuff: Once the electrode locations are final, place the red and black electrode markers over the electrodes. Carefully lift the cuff up and over the electrodes. Make sure the cuff is aligned superior/inferior and medial/lateral before you allow the Velcro on the markers to stick to the cuff liner.

- **Optimizing stimulus response – adjusting WalkAide settings:**

What exactly is the “stimulus”? The stimulus is actually a series of **pulses** delivered at a certain **rate** per second (frequency), at a certain **distance apart** (time between) and with a certain **size** (pulse width).

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(Frequency and time between are inversely proportional; adjusting one will adjust the other. WalkAnalyst will show the values for both parameters.)



Pulse width defines how much stimulation goes into the tissues with each pulse. A narrow pulse width means a smaller amount of current is going into the soft tissue; a wider pulse width means a larger amount of current per pulse. The WA can be adjusted from a pulse width of 25 to one of 300.

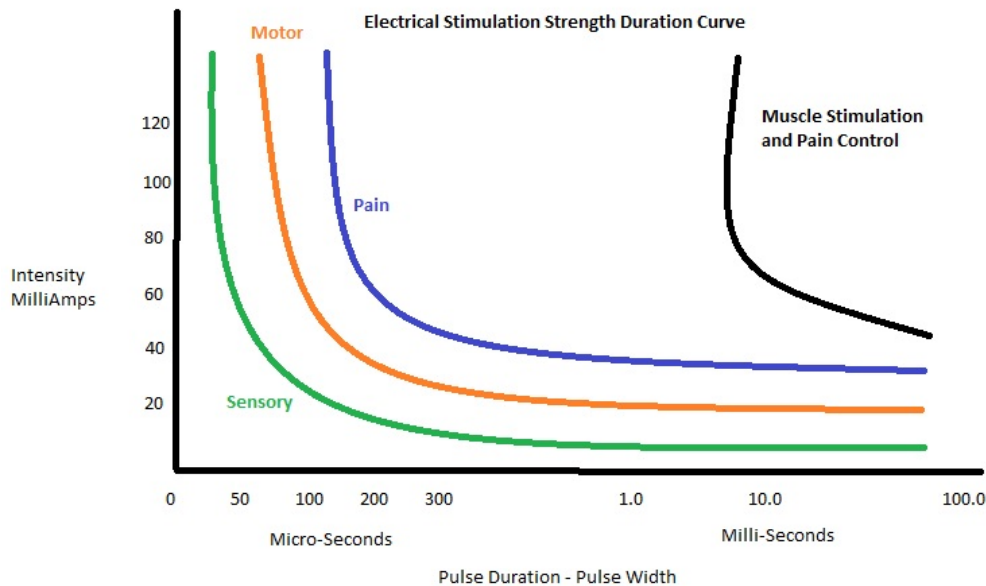
Frequency defines how often the pulses occur in a second. A higher pulse width means a pulse (or amount of current) goes into the soft tissues more often; lower frequency means less frequent pulses. The WA adjusts from 16 to 33 pulses/sec

Changing the stimulus parameters will not affect the dorsiflexion/eversion balance. Changes to the stimulation parameters can change the sensation of the stimulation and the strength of the muscular response. Adjustable stimulation parameters are: pulse width, frequency, extra stims, and ramping up or ramping down.

○ **When and why might you want to:**

1. **change pulse width?** Increasing the pulse width increases the amount of stimulation and the strength of the muscular response. *Increase the pulse width* when you have the WA turned up to full intensity but the muscular response is not adequate. *Decrease pulse width* when the WA is barely turned on and the muscular response is too strong for patient comfort. (NOTE: if you have the WA turned up to the highest intensity at a pulse width of 300 *and you still cannot get a response*: the patient either has significant edema or adipose tissue that is preventing the stimulation from reaching the nerve, or there is some peripheral nerve dysfunction. Patients in this situation may not be appropriate WA candidates.)

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2. **change frequency?** Often the stimulus is uncomfortable or the patient complains of the stimulation being “biting” or stinging. **Increasing frequency** “smoothes” out the stimulus and alleviates some of the stinging quality. (Note: Increasing the frequency adds more pulses per stimulation time period. Increasing (or decreasing) the frequency will also change the strength of the response, but in a much more subtle way than a pulse width adjustment.)

3. **add extra stims?** “Extra stims” are extra pulses that you can add to the beginning of a stimulation cycle. They provide just a bit of extra strength to the response because of the added current going in with each added pulses. Extra stim are good to add if the patient’s response is sluggish or lagging a bit behind the start of the stimulation cycle. Extra stims also increase the frequency right at the beginning of the stimulation. They are helpful when a patient complains of discomfort as the stimulation cycle begins.

4. **add a ramp (up or down)?** Ramping up means that when the stimulation comes on it increases gradually until it is at full strength; ramping down means the stimulation goes off gradually. Ramping up is helpful when the patient tends to startle when the stimulation comes on or has significant clonus. Ramping down allows the WA to stay on a small amount of time past the off threshold. This can be helpful to prevent foot slap or to control knee recurvatum at heel strike.