

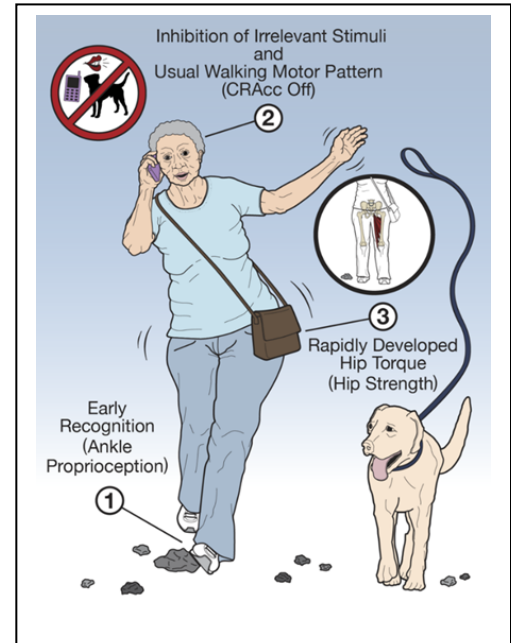
SUGGESTIONS FOR BALANCE

Studies have shown that being unable to stand on one foot for more than 10 seconds increases risk for falls 5-to-10 years in the future. We hope that the information we give you today will reduce your future fall risk!

General Balance Information

Good one-legged balance requires us to keep the center of our bodies (behind your belly button) over the center areas of our foot. This happens by making a series of rapid, nearly automatic muscle adjustments. Each adjustment requires:

1. Accurate, precise information from our foot and ankle
2. Quick mental processing of that information by our brains
3. Quick brain instructions to the muscles for the correct adjustments
4. Sufficient strength at the ankle, hip, and trunk muscles to perform the necessary adjustments
5. Then we, once again, need accurate, precise information from our foot and ankle to determine whether the adjustment was successful, not enough, or too much.



And this same process occurs repeatedly until we lose our balance or decide to stand on two feet. These foot and ankle adjustments are **QUICK!** They often occur 2 to 3 times per second while standing on one foot, which means that the entire adjustment cycle, #1 through #4, takes a fraction of a second! The shorter time it takes to sense a change in balance and adjust to it, the better the one-legged balance. Similarly, anything which makes the adjustments take longer worsens balance.

Quick strong adjustments = good balance

Slow weak adjustments = poor balance

If your ability to feel accurate and precise information from the foot/ankle is reduced (less than 10 seconds):

There is often nothing that can be done to improve sensation from the foot and ankle. But knowing that your foot and ankle sensation is altered the following strategies can improve balance function:

- a. Check your vision and get the best possible prescription for glasses
- b. Avoid bifocals while up and about as they can lead to falls

- c. Touch people or stable furniture, handrails, and walls
- d. Increase your trunk and hip strength, and your brain's alertness and processing speed. These will improve your balance even when your foot/ankle sensation cannot be improved.

If your ability to quickly process foot/ankle information and give movement instructions for balance adjustment is reduced (Reaction Accuracy less than 65%):

- a. Improve your sleep (Do you have sleep apnea?)
- b. Consider caffeine in the morning and at noon
- c. A single bout of exercise temporarily increases alertness and brain processing speed
- d. Long-term exercise appears to improve brain anatomy and improve brain processing speed over the long term.
- e. Evaluate your medicines because some can slow our brain speed (e.g., "sleeping pills" or other medications that can make you sleepy or "cloudy").
- f. Control your blood pressure and blood sugar.
- g. The importance of social and emotional health matter also, so if you have excessive stress or loneliness improvements in these can also improve your processing speed.
- h. A combination of exercise and mindfulness has been shown to help brain processing speed even in people who have had concussions/brain injuries. Mindfulness example can be found: <https://www.anxietycanada.com/articles/mindfulness-exercises/>)

If your ability to quickly develop sufficient muscle strength to perform adjustments is reduced (side plank less than 15 seconds):

- a. Losing weight while keeping your strength will improve your balance.
- b. Trekking poles can be helpful on bumpy and irregular surfaces until you get stronger.
- c. If you have had stomach surgeries in the past, these can reduce your ability to get stronger in the trunk and "core". Consider an abdominal binder for temporary use when you need your best balance.



Excerpted from Department of Physical Medicine and Rehabilitation, University of Michigan Judicious Early Detection of Impending Imbalance (JEDII) clinic