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Can You Pass the 10-Second Balance Test?

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STORY AT-A-GLANCE

- Research confirms past studies showing that the ability to perform a 10-second, one-leg stand is independently linked to all-cause mortality
- Falls increase the risk of death in older adults and are the No. 1 cause of death and injuries in older Americans. The number of deaths from falling rose from 8,613 in 2000 to 25,189 in 2016
- Factors that increase the risk of falling are poor balance, some medications, using multiple medications simultaneously, loss of muscle mass, vitamin D deficiency and inner ear problems such as Meniere's disease and benign paroxysmal positional vertigo
- After addressing underlying medical problems that affect balance, you can improve balance using yoga, improving core strength, and doing exercises like heel-to-toe standing and walking or high-knee marching

Research[1] published in August 2022, confirms that the ability to perform a 10-second, one-leg stand is independently linked to all-cause mortality. During the pandemic, an already largely sedentary American population began moving even less.[2] Lockdowns and transitioning to working from home increased the tendency to sit at the computer for long hours.

This has taken a toll on physical and mental health. Although evidence is clear that regular exercise is vital to good health, researchers also recognize that even just standing makes a positive impact on your health. For this reason, many fitness trackers now have goal settings that include reaching a standing time goal.[3]

Sitting has a low energy expenditure and contributes to muscle atrophy from disuse. Both are associated with poor health outcomes. Prolonged, uninterrupted sedentary time also promotes cardiometabolic disorders, obesity, depression and all-cause mortality in adults.[4]

Researchers have also found that there are a higher number of musculoskeletal symptoms associated with individuals who sit for prolonged periods and it even appears to accelerate aging at the cellular level.[5] It appears that older adults can impart a positive impact on all-cause mortality by improving their balance.[6]

10-Second One-Legged Stance Helps Predict Survival

The study[7] published in the British Journal of Sports Medicine sought to evaluate if the ability to complete a 10-second, one-legged stance was associated with all-cause mortality. The researchers also looked to see if it was a relevant prognostic indicator for mortality.

They assessed 1,702 individuals, 68% of whom were men between 51 and 75 years of age. The assessments took place between 2008 and 2020. In this group, 20.4% of the individuals were unable to complete a 10-second, single-leg stance during testing.

The researchers then followed up roughly seven years later and found 7.2% of the 1,702 individuals had died. In the group that died, 4.6% had been able to perform a single-leg stance and 17.5% had not. Even after adjusting for age, sex, body mass index and other comorbidities, the risk of all-cause mortality continue to be higher in those who were unable to perform a single leg stance. The researchers concluded:[8]

> *"Within the limitations of uncontrolled variables such as recent history of falls and physical activity, the ability to successfully complete the 10-s OLS is independently associated with all-cause mortality and adds relevant prognostic information beyond age, sex and several other anthropometric and clinical variables."*

A 2014 study[9] published in the journal Stroke evaluated the ability of 1,387 apparently healthy middle-aged to elderly individuals to stand on one leg for one minute. After the test, the participants underwent a brain MRI scan to assess the health of their small blood vessels.

The data showed that those who could not stay on one leg for 20 seconds or more had a higher rate of reduced cognitive function and micro bleeding in the brain with small lacunar infarctions, which sometimes go undetected. Dr. Shari Rosen-Schmidt, a neurologist who was not part of the study, said that although the test is far from definitive, it is a warning sign for someone who always had good balance to suddenly be unable to maintain their balance on one leg.[10]

Researchers have also found the balance-sensing systems in individuals with Alzheimer's disease are more severely impaired than those with mild cognitive impairment.[11] Brain imaging indicated that activity in the hippocampus was positively correlated with the index of postural stability.

The researchers believe that balance changes in the hippocampal pathway may be a marker that providers can use for the diagnosis of mild cognitive impairment versus the progression of mild cognitive impairment to Alzheimer's disease.

Falls in Older People Increase Risk of Death

Researchers in the featured study wrote that balance diminishes as individuals reach and exceed the mid-50s, which increases the risk for falls. In 2016, the CDC wrote that "Every second of every day in the United States an older adult falls, making falls the No. 1 cause of injuries and deaths from injury among older Americans."[12]

In 2020, doctors at the Iowa Specialty Hospital wrote that falling kills more women every year than breast cancer.[13] They believe that balance falls into the category of "use it or lose it." And, if you lose it, it comes with significant consequences.

One 2019 study[14] published in JAMA looked at the number of deaths resulting from falls in U.S. adults who were 75 years and older. They found the absolute number rose from

8,613 in 2000 to 25,189 in 2016. The crude mortality rate also increased, more than doubling from 51.6 per 100,000 persons in 2000 to 122.2 per 100,000 persons in 2016.

This data represented a rising age-adjusted trend in mortality from falls between 2000 and 2016, which was consistent with data from Europe during the same time. While these numbers are significant, this study did not evaluate the circumstances behind the rising numbers in mortality and suggested that further studies should focus on falls in the oldest age groups and potential interventions.

The CDC[15] also recorded a rising rate of falls in adults aged 65 and older. From 2009 to 2018 the rate increased by roughly 30% and was observed in 30 states and the District of Columbia.

According to numbers from the CDC,[16] 34,000 adults aged 65 and over died in 2019 after falling. This made it the leading cause of death from injury in that group. Additionally, emergency rooms recorded 3 million visits after falls in older adults and medical costs that year reached $50 billion with three-quarters of the bill for falls paid by Medicare and Medicaid.

One of the more serious injuries an older adult can experience from a fall is a broken hip.[17] After repair and recovery from a hip fractures, many people are unable to return to living independently. Evidence also shows a high mortality rate following hip fracture. One 2011 study[18] showed the risk of mortality was three times higher than in the general population, including all major causes of death.

Another study[19] found a mortality rate of 21.2% in the first year after a hip fracture. The risk of mortality at a one-year follow-up declined slightly to 16.6% of patients in a 2019 study published in Scientific Reports.[20]

Factors That Can Increase the Risk of Falls

Poor ability to balance is one factor that can increase the risk of falls in middle-aged and elderly individuals. Another factor is polypharmacy. This is the use of multiple

medications at one time and is more commonly found in older adults. In people 65 and older, 89% take at least one prescription medication and 54% take four or more.[21]

This increases the risk of adverse effects, which can drive patients to look for drug treatments for side effects caused by an unsafe drug regimen. It's a vicious cycle that has been perpetuated by a health care system that revolves around pharmaceutical-driven, fragmented care. These side effects can include dizziness and falls.[22]

Singular medications can also affect your balance. These include antianxiety drugs like benzodiazepines, SSRI antidepressants, blood pressure medications, pain relievers and sleep aids.[23]

As you age, it is crucial to maintain your muscle mass. Yet, as has been demonstrated during the pandemic years, activity has declined. Strong muscles are needed for mobility, balance and the ability to live independently. Muscle is also lost far more easily and quickly than it is built. So, it is vital to find ways to promote and maintain your muscle mass as you get older.

Brendan Egan, Ph.D., is an associate professor of sport and exercise physiology at the School of Health and Human Performance and the National Institute for Cellular Biotechnology at Dublin City University in Ireland. In **his IHMC lecture**,[24] he reviewed the latest research on exercise training for aging adults, which places a significant focus on building and maintaining muscle, and the nutritional components that can help optimize training results.

Loss of balance is also an indicator of vitamin D deficiency. Evidence from animal models suggests that vitamin D is critical to the development of the inner ear, which affects balance and coordination.[25] An analysis of people with vestibular neuritis, characterized by vertigo, showed lower serum vitamin D levels than in people without vestibular neuritis.[26]

Another cause for peripheral vertigo, which means that the dizziness stems from a problem in the inner ear and not in your brain, is benign paroxysmal positional vertigo (BPPV).[27] This happens when calcium carbonate crystals deposited within the labyrinth

of the inner ear, become dislodged and end up in the ear canal. The crystals disrupt the flow of fluid and confuse your balance organs, which results in vertigo.

Meniere's disease is another condition that can trigger severe imbalance and vertigo.[28] This is triggered by an abnormal production of fluid inside the inner ear that causes pressure to build. Other causes can include infection and inflammation or anxiety and stress as the vestibular system interacts with the brain in areas that are involved in anxiety.[29]

6 Ways to Improve Balance and Stability

After addressing any underlying health conditions that may cause vertigo or loss of balance, there are strategies you can use to help improve your balance and stability and therefore reduce your risk of falling. Begin by taking a balance test to understand your baseline abilities.

This gives you a benchmark against which you can measure your progress. Stand next to a chair or wall so you can grab onto something stable if you feel yourself falling. Test your ability to stand on one leg on both sides. Measure how long it takes before you feel like you're starting to fall. Use this as your baseline and begin incorporating some of these strategies into your daily exercise routine.

1. **Yoga —** Angie Winn, Owner of Loft on Main in Florida, is a yoga instructor. She explains, “What yoga does is it calms you down and allows you to be more aware of your body and aware of your surroundings.”[30]

   She recommends a simple mountain stance as a good place to start. The tree pose is another yoga pose for beginners and the half-moon pose can help improve balance. She advises students to remember to breathe through their poses and to keep calm.

2. **Core strength —** Your balance depends on core strength. This includes muscles in your abdomen, back, buttocks and hip flexors. Improving core strength can reduce

problems with back pain and improve your functional ability. One of the simplest exercises that work most of your core muscles is planks.

Select an area where you can extend your whole body on the floor, and in much the same position you would do a pushup. Begin with your forearms on the floor and your legs extended behind you. Your elbows should be directly under the shoulders and your hands and forearms facing forward.

Look directly at the floor; do not try to hold your head up to look forward. Engage your abdominal muscles and raise your body to a pushup position, keeping your elbows on the floor. It's important that your body be in a straight line from your ears to your toes with no sagging or bending. This keeps the spine in a neutral position. Hold this for 10 seconds and then release to the floor. Over time, work up to 60 seconds.

3. **Heel-to-toe standing or walking —** You may be familiar with heel-toe walking as a neurological test you have done for your doctor. Practicing can help improve your balance. Begin by standing in place with one foot directly in front of the other so the heel of the front foot touches the toe of the back foot.

   Hold this position for up to 30 seconds. As you're able to stand for 30 seconds, try taking steps using this heel-to-toe format, pretending you're walking on a balance beam. Remember to do this near a stable piece of furniture or the wall for safety.

4. **High knee march —** Walk forward as if you're marching, bringing your knees to hip level so your legs are at 90° to your body. This requires good posture and engaging your core. Start slowly doing several marches a couple of times a day.

5. **Swiss ball —** This is another way to incorporate balance exercises into your day. A Swiss exercise ball can be used as a chair while you're sitting at your desk or watching TV in the evening. Sitting on the ball helps to engage and strengthen your core muscles.

6. **Wobble board —** This piece of equipment gives you an unstable surface to practice balancing. The board has an air-filled ball beneath it. Stand on the board with your feet shoulder-width apart and try to balance. Do this near a wall and other stable furniture for support. Work up to standing on the board for up to two minutes.

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