



CHANGING WOBBLER INTO WINS: HELPING OLDER ADULTS STAY UPRIGHT

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YOUNG REVIEWERS:



JACOB

AGE: 12



KENNEDY

AGE: 12



NEIL
MAKSYMILIAN

AGE: 8

Have you ever wondered how people maintain their balance? This article is an exploratory journey into the human body's remarkable balance system. Many body parts work together to stay upright. This article explains why balance can become challenging as people get older and why some people, like gymnasts and dancers, are exceptional at it. Importantly, this article also covers the science behind falls and the importance of balance exercises for preventing them. Falling does not have to be part of getting older. By learning about balance, we can appreciate the intricate teamwork within our bodies and discover ways to help our older relatives and friends to improve their stability. Using the strategies in this article, you can help older adults stay upright, and change wobbles into wins!

OLDER PEOPLE CAN TRIP OR WOBBLE

Falls are surprisingly common, and they typically become more common as people get older. Around one in three people aged 65+ fall each year. Some people need to go to hospital after a fall. Balance has a big role in keeping us upright, or in other words, preventing us from falling. So it is worth thinking about how balance works, and how we could all improve our own balance and help other people improve their balance, too.

PROPRIOCEPTORS

Sensors in muscles and joints that help people know where their body parts are, even when they cannot see them.

HOW OUR BODIES BALANCE

So much is going on inside our bodies to keep us upright, regardless of whether you are a tightrope walker, a sleepwalker, a dog walker, or anything in between!

First, **proprioceptors** are tiny sensors in our muscles, tendons, and joints that send messages up to the brain when they sense stretch, pressure, or movement (Figure 1). If you start to trip or slip, these sensors send their messages up to your brain. Additionally, your eyes are like cameras, taking photographs to help the brain understand where you are in space. For example, when you ride a bike, your brain sees the road, trees, and other kids. It knows you are moving forward. If there is something in the way that you could trip over or run into, your eyes send a message to your brain.

Figure 1

To stay upright, people need their proprioceptors, eyes, otolith organs, and their cerebellums. People also need enough reaction time to respond to a trip, and they need coordination and muscle power to stay upright if something goes wrong.

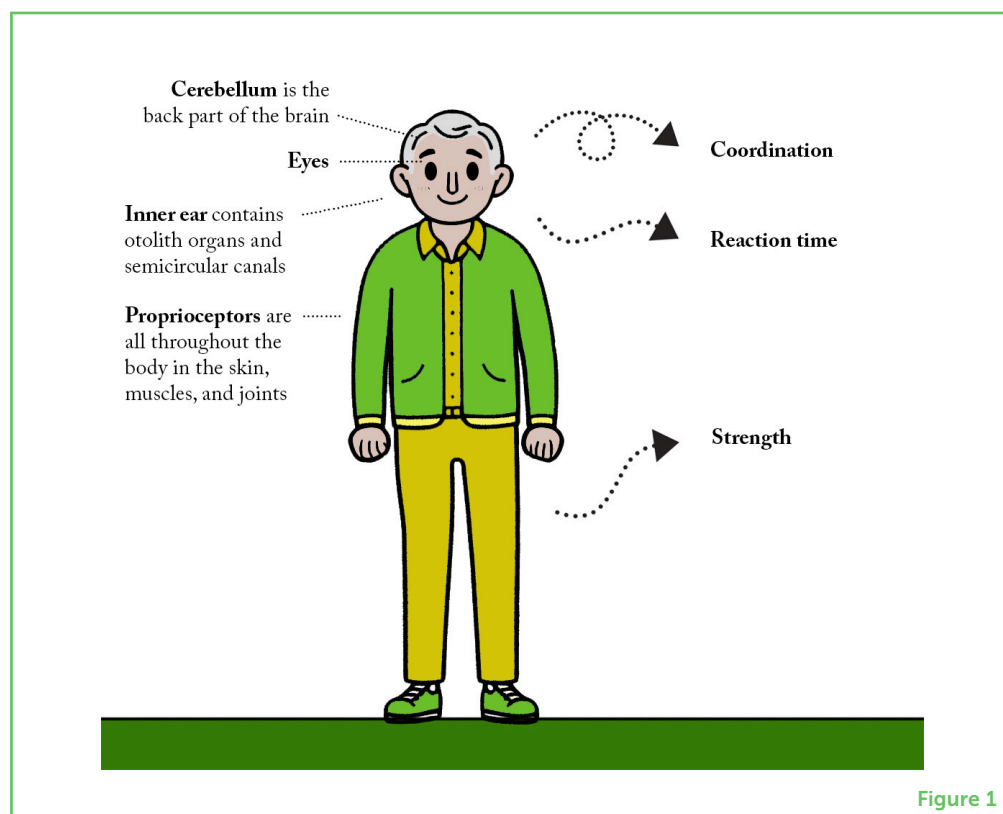


Figure 1

OTOLITH ORGANS

Parts of the inner ear that help people stay balanced by sensing movement and gravity.

SACCULE

A small part inside the ear that helps people feel up and down movements, like bouncing or jumping.

UTRICLE

A small part inside the ear that helps people feel side-to-side movements, like when they turn their head.

SEMICIRCULAR CANAL

Curved tubes in the ear that help people keep balanced when they spin or turn quickly.

CEREBELLUM

The back part of the brain which, among other things, coordinates balance.

At the same time, deep in your inner ear are two **otolith organs** called the **saccule** and **utricle**, which send messages to your brain, like, “Hey, we are leaning left!” or “We are looking up!”. It is like we have little gravity compasses to help us stay upright. Deep inside your ears, you also have **semicircular canals** filled with tiny crystals. When you move your head, these crystals jiggle around. Your brain notices this movement and figures out which way your head and body are tilting or turning.

After getting all these messages, a part of the brain called the **cerebellum** helps you stand upright, walk without wobbling, and even catch a ball—like a balance coach. The cerebellum is also the secret behind humans’ incredible coordination! We need to have good reaction time to quickly respond to hazards that might make us trip or slip, and we need strong muscles that can turn on quickly, to help us stay upright if we do start to fall. We must coordinate all these actions to turn the right muscles on and off at the right times. The cerebellum helps us do this! Our bodies clearly have a fantastic team of parts, working together to keep us steady.

EXTREME BALANCE HEROES

You may have come across some people who are very good at balancing because they have practiced movements and positions many, many times, over and over again. Here are some examples:

- *Gymnasts*: Twisting and flipping through the air, gymnasts must have excellent balance to land on their feet every time.
- *Dancers*: Ever seen a ballet dancer spin gracefully on one toe? Dancers train for years to make those well-balanced pirouettes look effortless.
- *Rock Climbers*: Scaling vertical cliffs and overhangs, rock climbers rely on balance as much as strength. They stay steady, even when perched on the tiniest of footholds, all while calculating their next move to ascend safely.
- *You*: If you can go about daily activities (like walking around, climbing stairs, or pushing yourself in a wheelchair) without falling to the floor, your balance systems are working hard without you realizing. This is because you have learnt to do these activities so well, your brain can now do them without you thinking about them.

WHY MIGHT OLDER ADULTS WOBBLE?

Everyone gets a little weaker and wobblier as they get older. Older people’s balance systems can stop working so well, their reaction times can get a little slower, and their muscles can get a little weaker. This makes people more likely to “lose their balance”, slip or trip, and

have a fall. Additionally, in older people, eyesight can get a bit blurry, and hearing is not always as sharp. This can make it harder to see bumps in the path or hear things behind them, leading to surprises that throw them off balance. But it is not just age. Some health problems and medicines, uneven floors, or messy rooms can make anyone trip, young or old.

WHAT DOES SCIENCE TELL US?

Research has helped scientists better understand falls and how to prevent them. We now know that falling does not have to be part of getting older. Exercise and generally being more active can help keep the balance systems working well. Exercises can also prevent a lot of falls, especially exercises that make balance better [1]. Exercises that make our muscles stronger can help, too. Any physical activity is good for us—the World Health Organization tells us that “any movement is better than none” and “more exercise is even better” [2].

WHERE TO START

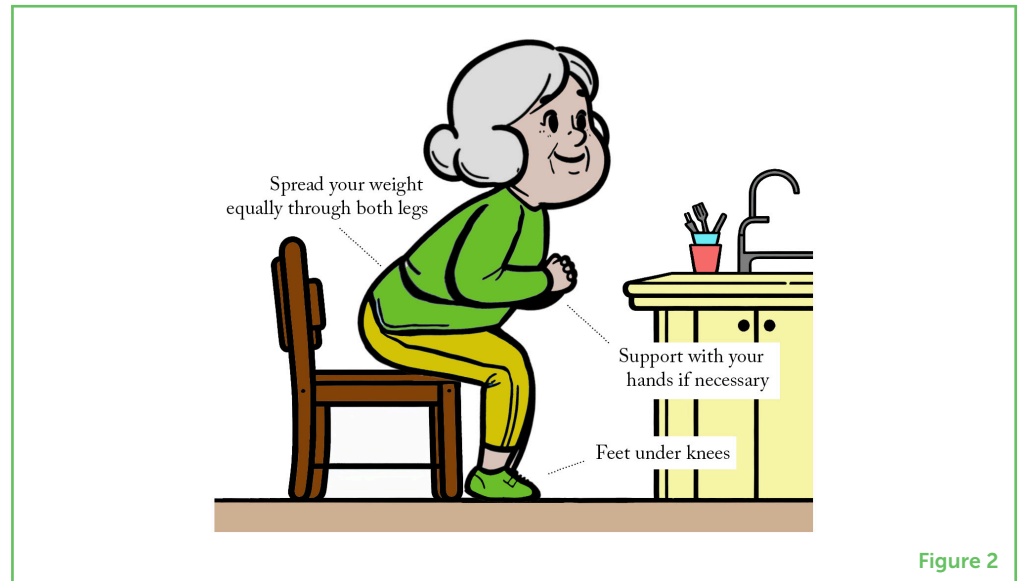
People usually do not have the advanced balance skills that some animals have. We do not land on our feet like cats, nor do we have tails like squirrels, which help them steer and stay upright as they jump from tree to tree. But everyone *can* improve their balance with practice. Here are some exercises you might like to try yourself and share with older adults you know. These exercises are suitable for *anyone* who may have trouble balancing—not just older people. Use a stable object (like the kitchen bench or a nearby wall) for stability, and try these:

- *Stand on one leg, like a flamingo*: Flamingos are famous for their one-legged stance. Try being a flamingo by standing on one leg. See if you can do it while counting to 10, 20, or even 30! Now see if you are as good with your eyes closed.
- *Rise up onto your toes, like a puppy trying to see outside a window*: Dogs can stand tall on their toes to look out windows. Push up onto your tiptoes and stretch as high as you can, just like a pup on the lookout.
- *Sit to stand 10 times, like a frog*: Frogs are great at jumping up from a sitting position. Pretend you are a frog leaping from a lily pad by sitting in a chair, standing up and sitting down again. Can you do this 10 times? Or 20 times? Can you do it without using your hands (Figure 2)?

These exercises are not only fun, they also help strengthen the muscles needed for better balance. So, hop to it and have a blast improving your balance! See if you can also help your older relatives and friends to improve theirs. To avoid falling, they might need to do these exercises

Figure 2

A grandmother doing a sit-to-stand exercise from a chair, with the kitchen bench nearby.

**Figure 2**

a little more carefully than you do. Make sure the bench is close for the flamingo and puppy exercises, in case they need to hold on at first.

THE POWER OF PRACTICE!

Now that you know a whole lot more about balance and falls, here are four ways to help older adults stay steady and prevent falls:

- The right exercises can help muscles get stronger, improving balance. Practicing standing up from a chair or squatting down is a good way to start. Then try carefully standing with both feet close together, and then on one leg. Going up and down stairs is great exercise, too. More information can be found [online](#), and if you are not sure where to start, a local doctor can refer you to a health professional like a **physical therapist**, who can assess you and provide advice (for more information on physical therapy, see [this Frontiers for Young Minds article](#)).
- Become an older person's exercise buddy. Being active is one of the *best* ways to stay strong at any age. Daily physical activity is recommended from a very young age [3], so you can start setting a good example today by becoming an exercise buddy for your older relatives! Take a walk together, play silly balance games (like "who can stand on one leg the longest?"), or even dance to your favorite songs.
- Become a trip detective. Look around the house for things that might get in the way and cause falls—loose rugs, toys on the floor, or sneaky cords. Can you clean them up?
- Talk, talk, talk: Many people feel embarrassed talking about falls. But you can start the conversation. Ask your older relatives and

PHYSICAL THERAPIST

A healthcare professional who helps people improve their movement, strength, and balance.

friends if there is anything that makes them feel unsteady and if they have ever talked to a doctor or physical therapist about it.

Using these strategies, you can help older adults to stay upright, and change wobbles into wins!

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YOUNG REVIEWERS

JACOB, AGE: 12

I am a 12-year-old boy who loves to learn and gain knowledge. Some of my hobbies include playing sports such as basketball and baseball. I am always up for a challenge while having a good time. I really enjoy solving problems and being patient in the



process. I also enjoy playing video games with my friends. Overall I am enjoying life and looking forward to what is to come next.



KENNEDY, AGE: 12

Kennedy grew up always loving math and science staying curious and asking questions about everything. Her current hobbies include dance, hanging out with friends and family, and trying new foods. When she grows up she wants to be a professional dancer or a traveling nurse.



NEIL MAKSYMILIAN, AGE: 8

I am a gymnast who loves math and art. Living in Poland, where football is a big deal, I enjoy playing it too. My dad, originally from India, taught me cricket. When I grow up, I want to be a detective.

AUTHORS



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Joshua is a senior lecturer in physiotherapy at the University of Technology Sydney. Joshua's program of research is in pediatrics and he specializes in chronic pain and large-scale education about health sciences. He loves that moment when his students say, "Aha! I get it now!". Outside of work, he enjoys reading books with his three kids and using power tools to build cool stuff. *joshua.pate@uts.edu.au



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