

Balancing People

On SCOPE's Balance episode, Julia and Dr Rob rounded up some students from Milton State School to test some theories about human balance.

Here's how you can do it at home:



What you need:

- An object about 20cm long that will stand on its end. We used a block of wood, but you could use a posting tube or box of tissues.
- Stop watch
- Measuring tape
- Friends and a computer (if you want to compile your results)

What to do:

Centre of Mass Test

1. Kneel down and place the object in front of you at a distance measured by placing your elbow against your knee and laying your arm flat on the ground. Where your fingertips reach, place the object to be nudged over. (see the picture below).



2. Hands behind your back and slowly lean forwards to try and push the object over with your nose.
3. People with a lower centre of mass will find it easier to do without falling forwards.

Walk the Line

1. Find straight line somewhere that is at least 5 metres long (like on a tennis court, or just find a bit of timber long enough and lay it down)
2. Spin around a set number of times (we used 5) then immediately try and walk along the line using baby steps (heel to toe).
3. Measure how far before you veer off course.
4. After you have mastered that (or not) try some variations. Spin with your eyes closed, spin looking straight up, or spin like a ballet dancer (they use spotting, fixing their gaze on a point and whipping their head always back around to that point)
5. See how the results compare.

One Leg

1. Pretty simple. Stand on one leg as long as you can.
2. It works best if you are not allowed to move the standing foot at all. We allowed hopping on the day we did it, and set a 5 minute time limit. Hopping certainly helped some people maintain balance.

What's happening?

The centre of mass test is just that, trying to find out if a person's centre of mass is higher or lower. It is usually lower in males than in females. In the Scope team, when we tested it, all the girls could do it, none of the boys could. At the school the girls still came out on top, but not by as much, possibly because the students rush through it, but also maybe the difference isn't as big in younger people.

Having a lower centre of mass in theory helps to maintain balance in other tasks, hence the idea that females are better at balancing.

Walk the line is a test to see how quickly a person can regain balance. Spinning should upset the vestibular system, by swirling the fluid in the inner ear. The girls were definitely better at this in our experiments, walking on average twice as far as the boys. Perhaps the lower centre of mass helped them.

Altering the way the groups spun around only really showed that looking up disturbed the vestibular system even more, this group had the worst balance after spinning.

The group using the ballet technique of spotting showed no real improvement on average, but this might be just because it is a hard thing to master.

Standing on one leg is testing proprioception. That is how well your body can detect its own position. It is the part of balance that can be trained, how well you muscles feedback information to the brain in order that a potential overbalance can be quickly corrected.