

Soleus - the muscle that can ward off frailty and cognitive decline - and how to strengthen it



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Exercising your soleus is vital to staying mobile, protecting against injury and even maintaining cognitive function as you age



Courtney Conley, a doctor of chiropractic medicine, says the soleus is ‘the most underappreciated muscle of the lower leg’ Credit: Clara Molden

Allow me to introduce you to [a muscle](#). It’s a quietly vital, mostly neglected, rarely mentioned body part.

It plays a key role in [mobility](#), [fending off injury](#) and even warding off [cognitive decline](#), but it’s hard to see, and most people ignore it. I

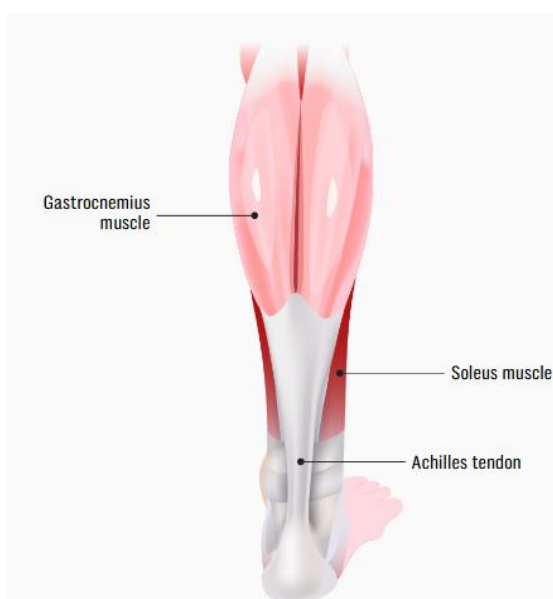
f your arms are the Hollywood stars of your anatomy, this muscle is a lighting engineer.

Please meet the soleus, and prepare to change your exercise routine forever.

Courtney Conley is a doctor of chiropractic medicine and a global authority on walking, running and gait. She’s the author of the best-selling book *Walk: Your Life Depends On It* and has appeared on *The Diary of a CEO* and *Feel Better, Live More with Dr Rangan Chatterjee*. She calls the soleus “the most underappreciated muscle of the lower leg” as well as “one of my favourite muscles in the body”.

The soleus is part of the group of [muscles that make up your calves](#), but it isn’t the ball-like muscle you can see on bodybuilders; it runs behind those, connecting the knee to the Achilles at your heel. When you walk or run, it’s the soleus that gives you the power to push off the ground with the balls of your feet. If you want to keep moving as you age, if you want to move without pain, without foot and knee injuries, then it’s important to start working on your soleus.

The soleus’ potential health benefits - Remaining mobile as we age



The muscle plays a key role in almost any movement we make while standing.

“When we’re walking and running, it’s the muscle that puts a lot of force through the forefoot,” she says. “When I’m walking, the soleus force is a push of three to four times body weight; if you run, it’s six to eight times; if you sprint, eight to 10 times.

Because of sarcopenia, the natural muscle wastage as we age, this force becomes harder and harder to create, unless we take steps to strengthen it.”

If you imagine your foot as you work through a stride - you land on your heel, roll through to the front part and then push off for the next step - the pushing-off part of the work is led by the soleus.

This muscle creates the power to move us forward. The motion is different when we run or sprint, but it’s the same muscle enabling takeoff.

“When we start to lose capacity in that muscle, I will start to hear clients in my clinic say: ‘Walking is getting difficult for me.’”

There are footwear brands designed to help the foot rock forward, but Conley says these come with a health warning. “A shoe store will say, ‘We have a shoe that rocks for you’, and people put that on and say that it feels great, but there’s always a trade-off, because if you don’t use the soleus, you will lose the soleus.

This muscle needs to be strengthened to maintain capacity.” If this muscle is weak, it can be a hint of damage and pain to come. “When doctors do strength testing, a weakness of the soleus can be a predictor of conditions like Achilles tendonitis.”

Fending off diabetes

Sitting for long periods leaves the muscles in your legs inactive, which can lead to [high blood sugar](#) and [metabolic illness](#); exercising the soleus helps counter this effect. Prof Marc Hamilton of the University of Houston developed the soleus press-up. This is a simple up-and-down motion on the balls of the feet that can be done at a desk. It is meant to help lessen the damage done by long periods of inactivity.

Hamilton’s [research](#) found that relatively untrained, but healthy, people could perform this movement for over four hours without suffering fatigue, thanks to the soleus’ unusual makeup. The muscle burns fat and sugar rather than its own glycogen stores - this is very different from the way most muscles work - and makes it well placed to help us maintain healthy blood sugar during periods of inactivity.

If you are thinking of adopting the soleus press-up while you work, focus on the range of movement rather than the speed. Whether working or watching TV, while you are seated keep your thighs relaxed, press lightly on the floor with the front of your foot and simply move the heel up and down. You can do these for hours; try to maintain an even, controlled pace. The soleus press-up is quite different from the load-bearing exercises shown below, which are intended to make you more mobile and robust by strengthening the muscle. The soleus press-up is about ensuring healthy blood sugar.

Maintaining cognitive function

The soleus is also called the second heart. When it contracts it pumps blood upwards into the body, increasing the flow to the brain. “There is a correlation between the soleus and cognitive decline,” Conley says. “Cognitive decline is correlated with reduced cerebral blood flow. There is a study in which hypotensive older people had their soleus mechanically contracted once a day for three months: They saw significant improvement in cognitive performance.”

This is one of the less discussed [benefits of walking](#); every step sends blood pumping upwards and improves our brain’s ability to function. “We have to get people walking,” says Conley. “When you walk, you are getting that contraction of the soleus, which is helping cerebral blood flow.”

Protecting your knees

Strengthening the soleus can also set you up with knees that will last. The classic knee injury is the ACL tear. The anterior cruciate ligament is the ligament that keeps your knee in place, and when it goes you feel pain and a sense of your knee collapsing. The soleus keeps your knee safe by stopping the shin bone from moving forward under the thigh bone. “The soleus plays a key role in the prevention of ACL injuries,” Conley says. Focusing on exercises that strengthen this muscle is good preparation for any sport that will involve jumping, landing or twisting and, of course, simply moving around.

The best exercises to strengthen the soleus

These exercises should feel challenging. The soleus is a powerful muscle, and by the time you arrive at the end of a set you should feel as though you have only one or two more repetitions left in you. Conley says if her clients are able to watch TV while doing these, they probably aren't working hard enough.

1. Standing heel raise

While standing on one leg, drop the raised leg behind you and rest the ball of that foot on the floor. Once in position, move the heel of the front foot up and hold for 15 to 20 seconds, and then repeat five times.

This is an isometric exercise, which means holding the muscle under tension. Lean your weight forward, as if facing into a strong wind, so your weight requires effort from your front foot to hold you up.



2. Heel tap

Stand slightly away from a wall and have your arms support your weight against the surface. Raise one heel, and tap up and down.

Conley suggests using a metronome for this move to help regulate and control the movement.

This, she says, is not a calf raise; the emphasis is on pushing the heel onto the floor.



3. Weighted single-leg calf raise

This involves standing on one leg, holding a kettlebell or a dumbbell and raising and dropping the heel of the weight-bearing leg.

This needs six to eight repetitions and three to four sets. Hold still at the end of a set, keeping the muscle under tension for 10 seconds. Expect to be shaking slightly as you hold this. It's supposed to feel tough.



4. Plyometric jumps

It's important to train the springiness of the soleus, which involves an element of jumping. If jumping is hard, then you can begin with heel-to-toe walking and pushing up onto the balls of your feet as if about to jump.

Conley says she does some form of bouncing even with her oldest clients. When you are confident, perform small double-leg jumps.

"We can start with just a little heel raise and progress to a double-leg pogo,"

Conley says. "We need to understand our bodies are pretty resilient.

You have to introduce some kind of bounce."

