
Fixing Knee Pain

Pain Free Knees For Life

Today we're going to start to fix your knee pain. If you follow through with what I'm going to tell you I would expect you to start noticing improvements within a few days.

(Videos of all the exercises are at the end of the document)

THE OVERVIEW

The process starts with the big toe.

First of all look at your feet as they are firmly planted on the floor. Your toes should look like this:



Notice the position of the big toe and the gaps in between the toes. If yours look like this, good, that will make things a lot easier.

Now look at your shoes and imagine your feet inside of them.

Notice how (unless you are wearing barefoot shoes) your big toe will be forced to point further towards your little toe as a result. Most trainers and some shoes also incorporate an upwardly curved point which raises the toes off the ground and leads to them not being used whilst walking.

This weakens the toes considerably.

Inside your trainers your feet look something like this. They may well look like this when you go barefoot as well by now.



The big toe is not where the brain expects it to be.

With the big toe being “pushed in” like this as you walk the foot has a tendency to roll in towards the midline of the body (*as the big toe is not in a position where it can prevent this*).

The natural result of this is that the entire lower part of the leg (from the knee down) slightly collapses towards the mid line.

Leading to knee cave.

This is a bad thing.

The knee which is a hinge joint is now forced to hinge at the wrong angle and must make a shearing motion as it does so. This puts huge pressure on the surrounding tendons and on the knee capsule itself.

Your brain, in its infinite wisdom, realises it needs to fix this if it is to avoid long term damage to the knee.

It's solution is pretty genius.

By shifting weight onto the outside of the foot it manages to straighten the knee joint up.

You can see this in action.

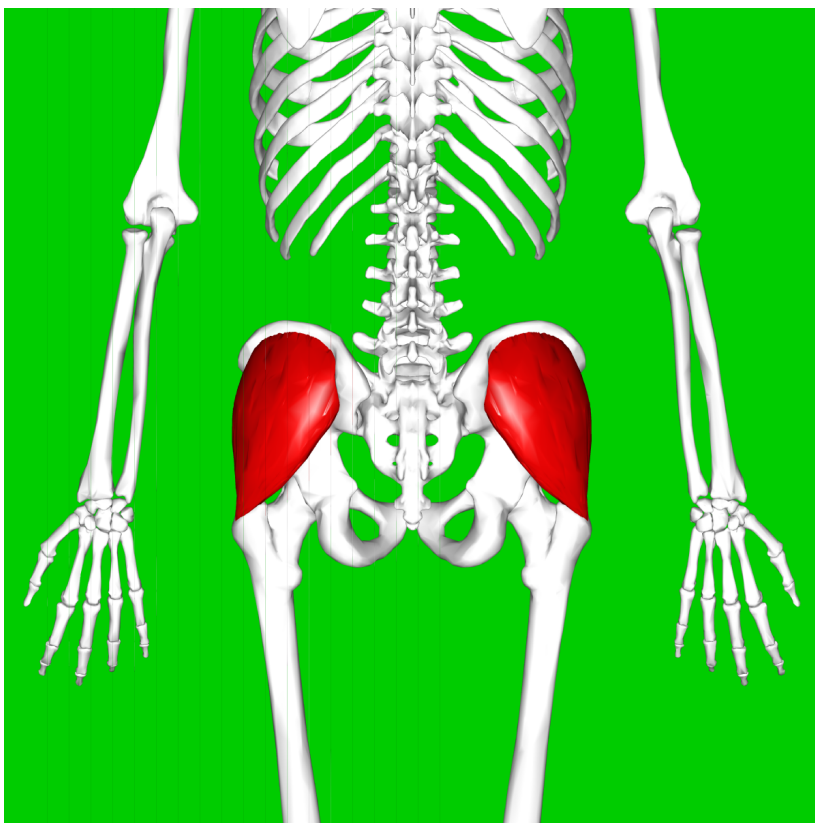
Stand up and simulate a knee cave (without moving your feet collapse your knee inwards towards the middle of your body). Now roll your foot to the outside and watch your knee straighten up.

This shift to the outside of the foot has another unintended consequence however.

It shifts weight off the big toe.

Now the big toe is getting a free ride and so it weakens considerable as it's no longer being used. At the same time the little toes become stronger.

This is a problem because the big toe connects through a chain of muscles to the Glute Medius, the muscle at the side of your bum.



The job of the Glute Medius is to pull the femur deep into the socket of the hip and so maintain joint stability.

With the big toe playing an increasingly passive role in day to day walking, this connection between big toe and glute medius, is also downgraded resulting in the glute medius slowly de-activating and becoming weaker.

This leads to the hip joint de-stabilising and the femur “falling” out of the the socket whenever placed under strain (as in when walking).

As the femur falls out of the socket the top of the femur

moves further away from the midline of the body.

The bottom end of the femur (the end which attaches to the knee) must move closer to the mid line to compensate, causing more knee cave, which causes the body to shift weight further onto the outside of the foot.

This starts a negative feedback loop.

Due to the position of the hip the foot has to shift weight further and further onto the outside which disengages the big toe more and more, which in turn de-activates and weakens the glute medius even more, which leads to more knee cave and forces the weight in the foot further out.

Your sequence of walking now looks something like this:

Your foot strikes the ground on the outside of the foot. At this point the knee is straight due to the placement of the foot. However now the femur falls out of the hip socket causing the knee to cave inwards. The foot shifts further outwards to straighten the knee up.

This all happens in the instant your foot hits the ground and you won't be aware of it happening as to you it'll just feel normal.

But it means the knee is wobbling from side to side as you walk as it attempts to do the hips job for it.

Over time if not treated this person will need a knee replacement.

The good news: This is really easy to fix and you can get started today.

TESTING

The first thing we are going to do is diagnose which particular area is worst for you so we can determine the correct treatment.

1. Stand on your tiptoes without thinking too hard about what you are doing. Observe where the weight goes in your toes.
2. Walk up and down. Notice where the weight is distributed in your foot as you do so. This may be really difficult to actually work out as your brain is so used to its particular way of walking it may struggle to actually transmit the information to you.
3. Perform a single leg squat. Refer to the video Single Leg Squats for how to do this.

When you stood on your tip toes did the weight shift over to your little toes? If so your big toe is weak and needs strengthening.

When you walked did your weight shift to the outside or inside of the foot? If so you need to practice walking with a correctly positioned foot.

Could you perform a single leg squat to a depth of 45cm without knee cave, if not your glute medius needs strengthening.

PHASE 1: STRENGTHENING THE BIG TOE

The first exercise you need to practice is calf raises. Remember how we said the big toe is connected to the Glute Medius? One of the muscles in that chain is the gastrocnemius muscle which forms part of the calf.



As this chain between big toe and glute turns off the gastrocnemius develops a weakness at a very specific point; where the muscle of the calf meets the tendon, right at the bottom of the chunky bit of the calf.

This needs strengthening if you are to realign the foot. The same exercise which does this, if done correctly, will also target the big toe.

What's the exercise?

Calf raises, but not just any old calf raises...

Performing A Calf Raise Correctly

Find a step, the steps in your house will do just great. Take your shoes off. (If you can't go barefoot for whatever reason try to wear shoes with as thin a sole and as wide a front as possible, barefoot shoes are fine to wear)

Stand with the meaty bit of your feet on the edge of the step with the foot running perpendicular to the front of the step. Hold on to the bannister or another support (this is not a balance exercise and you will need support).

Now with straight legs remove one foot.

Keeping the leg straight drop the heel of the foot holding you up down off the step, ideally you should see the toes raise off the ground.

Driving through the big toe push up until you are on tip toes on that foot.

As you push up your weight should drive down through the pad of the foot just behind the big and index toe.

The metatarsal bone (*the ridge like protrusion which forms the highest point of the foot*) should be pointing straight down the gap in between these 2 toes throughout the entire movement and the heel should track in a straight line up and down, without "screwing" to the inside.

Imagine you are trying to squash a bug using the pad of your foot just behind the big and index toes. You should almost be able to lift the little toe off the ground as there is no weight on it.

If you're doing these right you may only be able to perform a few of these with good form to start with, that's fine. It's a few more than you did yesterday and a great start.

What You Should Feel

You should feel this right at that point where the head of the calf meets the tendon right in the centre of the calf. This will probably be harder than you expect it to be, perhaps a lot harder, that is a sign you're getting it right. If it feels easy you're probably doing something wrong (*and nearly everyone does the first few times they try this*) so refer to the next section.

How To Spot Incorrect Form When Performing A Calf Raise

You will, especially in the early stages, naturally favour the outside of the foot and your little toes as you push up in the calf raise. This will become more pronounced the higher towards your tip toes you go.

How do you spot this? There are several clues I want you to look for to check if you're doing it wrong:

- The little toes will be firmly pushed into the floor and the big toe will often actually raise off the floor. Drive the big toe in to the step as if you were crushing a bug under it.
- The metatarsal bone will start to point outwards to the outside of the foot as the calf raises upwards. This may be a subtle shift and will become more obvious the higher up in the movement you go. Again the cure here is to imagine you are crushing a bug under the big toe all the way through the movement.
- The heel will screw inwards towards the midline of the body to assist in shifting the weight to the outside of the foot. Keep the heel tracking in a straight line up and down through out the movement.
- If you're wearing shoes (which I don't recommend) the crease formed in the front of the shoe should run at 90 degrees across the front of the shoe. If it slightly angled it means the weight is shifting out to the big toe.

Struggling To Get The Full Height?

The calf naturally loses strength the higher in the calf raise you go. For this reason you often see this weight shift outwards towards the top of the exercise. If you cannot prevent this from happening then only raise up as far as you can with good form. You can build up to getting the calf raises higher as your strength improves.

Why Form Is So Important

It is vital that you perform the calf raises with good form.

The main reason you're having problems is that your little toes are significantly stronger than your big toe. If you perform these exercises wrong and allow your weight to shift out to the little toes you are building even more strength in them...making things worse.

It is infinitely better to do less repetitions but perform those you do with perfect form rather than try to do lots of reps and perform most of them wrong.

How Many To Do?

The eventual goal is to perform 3 sets of 12 reps, 3 times a day.

Build up to this.

To start with you may only be able to perform 1 rep with good form whilst really helping yourself by leaning on something ...this is fine! **Take it slow and get it right.**

Practice this every day.

Calves take a lot of hammer in everyday life so you may notice them aching **a lot** the next day. If this is the case and it's unbearable, take a day off and let them recover.

Common Issues

Pain in the Achilles

If you notice pain in the achilles it's often a result of dropping the heel at the start of the calf raise.

The action of dropping the heel down off the back of the step to ensure a full range of motion often pulls and aggravates the achilles.

To cure this perform the calf raise from a flat surface (*like the floor*) so the achilles does not have to stretch so much. Slowly build up to working off a raised step as the achilles becomes less sensitive.

Bending the knee

The muscle we are trying to target is the Gastrocnemius. This muscle only does its job when the knee is straight. Keep a straight leg throughout the calf raise.

LEARNING TO WALK AGAIN

Now, rather patronisingly, I'm going to teach you to walk properly.

To do this you must imagine you have a tripod in your foot.

What do I mean?

At the moment you are most likely walking with a bipod.

For most of you that will be a bipod with one prong in the heel and the other in the pad behind your little toes. For a few of you this second prong will be on the other side of the foot, over behind the big toe.

The cure is the same:

You need to develop a tripod.

I want you to imagine you now have one prong in the heel, one in the pad of the foot just behind the big toe and index toe and one in line with this but towards the outside of the foot, just behind the 2 little toes.

All 3 prongs must engage equally when you are walking.

For those of you who walk on the outside of your foot this may feel like you are collapsing the arch, and will certainly feel very strange to start with.

The way to ensure you're not collapsing the arch (*which we certainly don't want either*) is to look at your inside ankle bone. This should remain rigid when you walk and not collapse inwards when the foot contacts the floor.

Many people, when I tell them to do this, start walking really oddly.

Your general gait remains the same, ie. you heel strike, roll through the foot and push off with the toes. I simply want you to switch where the weight is as you roll through the foot.

The final part of the walking action (*ie. the bit where you raise the heel and drive off through the toes*) should mirror **exactly** the calf raise we have just practiced. You should feel the big toe driving off the floor with the crease in your trainer (or foot) running perpendicular across the front of the foot.

The calf raises and new walking pattern work hand in hand to help each other...

You have 2 problems to fix.

One is simple muscular strength.

Your gastrocnemius and big toe are weak and need strengthening. This is what the calf raises are doing.

The other is your nervous system and brain.

You have developed an adapted movement pattern which needs correcting. This adopted pattern is the one we described earlier where the brain favours the outside of the foot and the little toes whilst walking.

Now depending on how long you've been walking like this and how much walking you've done this may take a while.

You need to wipe the old movement pattern (*walking with a bipod*) from the brain and nervous system and imprint a new one (*walking with a tripod*) over the top of it.

To start with this must be done consciously. **Which is a pain in the ass unite frankly.**

You will find yourself quite naturally going back to the old bipod style pattern of movement. The problem is that each time you do you are reinforcing that old movement pattern at the expense of the new one. So try to be cognisant whenever you walk of how you are walking and use your tripod.

Yes, of course, you will forget, but a good tip is to set yourself challenges where you go for walks (*often alone so you don't get distracted*) and the only aim for the walk is to focus on walking on your tripod.

Once you get this dialled you will have set up a positive feedback cycle where the calf raises are strengthening the gastrocnemius and big toe, which is straightening your feet up, which (*combined with your new movement pattern*) is meaning you walk better, which in turn strengthens the gastrocnemius and big toe...

As a word to the wise: this may take a while and can be quite frustrating..stick with it, it's worth it!

Now I want you to stop here and practice all this for at least 2 weeks. I want you to be able to perform at least 3 sets of 12 calf raises fairly easily before you move onto the next phase.

PHASE 2: STRENGTHENING THE GLUTES

Now this phase is a little more complex.

Go back and perform the single leg squat again.

I want you to see how far down in the squat you can go before the knee starts to cave, (which means it moves towards the mid line of the body) this will often be quite a pronounced shift which happens quickly.

Depending on how far down you could get before the knee caved will determine which of the following exercises you need to start with. You don't need to be hugely accurate with this measurements just a rough guesstimate will suffice, if an exercise is too hard try the one before it.

If the knee caved within the first 5cm >

Start with Single Leg RDL's

If the knee caved between 5 and 15 cm >

Start with Banded Lunges

If the knee caved after 15cm >

Start with single leg squats.

Wherever you start, work through the exercises in order, so if you start with the RDL's perform them until you can control the knee cave to a depth of 5 cm, then move onto the Banded lunges and when you can squat to a depth of 15+cm move to the single leg squats.

Before You Start

Before you start actually doing any of these exercises you need to activate the glute muscles. This is because they have been dormant for so long that if you just start doing the exercise then they will most likely remain deactivated which means all the surrounding muscles have to do the work for them...

We do not want this, we want those glutes to have to work.

So to activate them we have several options. The one which you should use is the one which feels like it's working your glute medius muscle the most.

For some of you, when you do these exercises, you may not notice it in the glute medius at all, instead you may notice your quad, your hamstring for lower back jumping in to try to do the work.

Keep doing the movement, eventually you should feel the tension move until it finally lands in the glute medius. If no matter how much you try and do the exercise you can't get the glute medius to fire, try a different exercise.

The exercise you finally do should be the one which activates the glute medius the most. *(ie. it's the most painful for the glute medius to do!)*

The exercises I want you to try are:

Banded Hip Bridge
Banded Leg Raise
Banded Clam Shell

One of these should hit the glute medius. Again it may take several reps for the glute medius to actually activate. Once it's activated, then you start counting reps.

I want you to do 3 sets of 12 reps of this exercise as a warm up. Your glute medius should now be ready to exercise.

Once The Glute Medius Is Activated

Perform whichever exercise you are working on based upon the depth of your single leg squat (ie single leg RDL Banded lunge or single leg squat.

Perform 3 x 12 reps of your chosen exercise a day, ideally you will do this 3 times a day.

The final goal is to perform 3 x 12 single leg squats from a height of 45cm with no knee cave or even wobble.

What To Expect

You should notice improvements in your knee pain within a few days of starting the calf raises. This will depend a little on where you start, if your calves are very weak and you can only do 1 or 2 calf raises with good form it take longer to feel the effects.

Certainly things should not get worse, if they do stop, leave it a few days re watch the videos to check your form is correct and then start again taking it slower.

You may notice *(especially late in the evening)* weird deep pains which feel like muscle ache in and around your spine and legs. This is normal, your posture is subtly adjusting and new muscles are having to do jobs they have long given up on.

You may also notice sharp, stabbing pains which dissipate quickly. This again is fine.

If you need help with this, you can always grab my [coaching program here >>](#). This includes this full program in our app, and 4 x 1 hour weekly live coaching sessions with Sam.

Here's to a pain free life!

Sam.

VIDEOS

Calf Raises
Single Leg RDL
Banded Lunge
Single Leg Squat
Banded Hip Bridge
Banded Leg Raise
Banded Clam Shell