

Pimp my stride

Words: Kerry McCarthy

Left foot. Right foot. Repeat. Job done, right? Not according to a growing school of thought that says incorrect form could be not only hindering your performance, but also setting you up for injury misery. In search of the perfect form, we sent RW's senior writer back to running school. His first report? Unsatisfactory. Happily, he discovered that with hard work, determination and a well-padded ego, efficient running is something anyone can achieve >>>

PHOTOS: JULIAN ANDREWS

LESSON 1
THINK YOU CAN RUN? THINK AGAIN...

“Are the cameras running?” says Mike. “OK, hop on the treadmill and we’ll see what’s wrong.” As I embark on my tale of injury woe, Mike holds up a hand. “I don’t want to hear it, I want to see it.” He hits the ‘on’ button. Twenty seconds later he hits ‘off’. “I know what the problem is.”

“But I’ve only been running for...” I start to argue. “You’ve got a problem in your left hamstring, which causes it to cramp regularly. You also get pain in your lower back and tightness in your glutes, and all this has been going on for, I’d say, more than two years?” I mumble something about a lucky guess, but follow Mike’s crooked finger to a video replay of my 20-second stint.

Over the next five minutes, using freeze frames and some fancy software that lets him draw on the screen, Mike Antoniadis, founder of The Running School,

THE SCHOOL CLAIMS IT CAN MAKE A THOROUGHBRED OUT OF ANY OLD ASS. I WAS READY FOR ASCOT

mercilessly breaks down my action: my heel lift is too low (weak hamstrings); my right foot is encroaching on the left foot’s territory as it hits the floor (lazy form); my hips collapse downwards on footstrike (poor core strength); my knees roll inwards (weak glutes); my feet splay outwards (overloaded quads); my arms rotate across my body (core strength again), and my pelvis – the foundation stone of the runner’s body – is too weak to stop any of this. Steve Prefontaine I ain’t – that much is clear. But before you shake your head in a perfect condescending arc, take a look in the mirror next to the treadmill. According to Mike, *all* runners have at least two of these issues to some degree – including elite athletes, of which more later. And the over-two-years thing? “You were doing all that so naturally you’ve obviously been overcompensating for a long time,” says Mike. “But don’t worry, we’ll fix you.”

Which is exactly why I signed up to have my self-esteem politely shredded to pieces over 12 weekly one-hour sessions. The Running School claims it can make a thoroughbred out of any old ass, and I was ready to trade

Blackpool beach for Ascot. My running career started eight years ago when a colleague claimed I couldn’t put down my Cornish pasty long enough to train for a marathon. Fuelled by umbrage, I ran seven miles that night and increased the mileage arbitrarily as the weeks progressed, with no clue about nutrition, recovery or cross-training. I finished the marathon 16 weeks later with supports on both knees and one ankle, plus a torn hamstring. After several similar experiences I arrived at RUNNER’S WORLD unable to run more than 10K without needing a walk break to loosen everything up – a state of affairs which, to my personal and professional shame, had more or less continued until now.

Admittedly, I’m a fairly extreme case. But even if none of that story sounds familiar, a growing swathe of opinion holds that the form-focused philosophy could help you, too. In most sports, it’s well established that technique and performance are closely linked. Golfers derive power from their hips, for example, so hip engagement and rotation are pretty well correlated with how far and how accurately a golfer can drive a ball. Running, so traditional thinking goes, is different. How fast you run is mostly about bioenergetics – internal stuff, like the strength of the heart and efficiency of the muscles – not biomechanics. So if you want to get faster, conventional thought continues, you’re better off racking up intervals, not perfecting your arm swing. Recently, however, the hands-off approach to running form has been seriously re-examined throughout the sport, from running scientists such as Harvard’s Daniel Lieberman to elite coaches such as Alberto Salazar. Chatter on the topic fills running forums and blogs. Form, it seems, suddenly matters.

LESSON 2
IT’S EASY – WHEN YOU KNOW HOW

“And again,” says my coach Teri Knight. Teri is small and pretty with a cheeky grin, and I had pegged her for a soft touch. Thirty-five minutes and umpteen ‘correct form’ reps at tempo pace later, two thoughts occur: one, my fitness needs attention; two, Teri is not a soft touch. “Arms back, shoulders down, heels higher. Higher. HIGHER! Now don’t forget the arms, you’ve >>>



THE ONLY WAY IS UP
Above: Running on an incline will take your form to new heights

ANALYSE THIS
Far left: Coach Teri Knight points out what’s wrong with Kerry’s (running) style

BEFORE & AFTER
Left: Freeze frames show Kerry’s heel-lift

WHICH RUNNER ARE YOU?

Use Mike Antoniadis’ guide to spot which of the most common running types you fall into, and learn how to put things right. Either watch yourself running in the mirror at the gym, or get someone to film you to discover what you need to work on

THE THUMPER

▶ SPOT YOURSELF You hit the ground hard – and spend too long there, causing pressure on your ankles, knees and hips. You also overstride, putting pressure up the back of the body.
▶ INJURY RISK Overuse injuries in the lower body: shin splints, knee pain, iliotibial (IT) band syndrome, Achilles tendinitis, hamstring tears...you name it.
▶ FIX YOURSELF Learn to be light on your feet. Run on a treadmill on a gradient higher than five per cent to force yourself to pick your feet up quicker. Do reps of 30 seconds on an incline, 30 seconds on flat.



THE TWISTER

▶ SPOT YOURSELF Your arms move side to side, crossing the centre line of your torso. Your feet also start crossing the centre line on landing.
▶ INJURY RISK Lower back pain and hip flexor strain.
▶ FIX YOURSELF Teach your arms to move as though they’re on rails. Stand facing a mirror. Bend your arms 90 degrees at the elbow, forearms horizontal to the ground, hands cupped. Pump them back with your shoulder blades, not your elbows. Keeping the 90-degree angle, aim for a shoulder-to-hip range from your hands.



THE OCTOPUS

▶ SPOT YOURSELF Your arms and legs move in different directions (think Phoebe from *Friends*). It happens with inexperienced runners, especially at the end of races when you’re windmilling to try to keep up speed.
▶ INJURY RISK IT band syndrome, lower back pain and abdominal muscle pulls.
▶ FIX YOURSELF Strengthen your core with crunches, front and side planks, and Superman curls (go to runnersworld.co.uk/core for more core moves). Also learn to use your arms properly (see *The Twister*) and stretch regularly.



WEEKEND WARRIOR

▶ SPOT YOURSELF You’re dedicated, but can only train at weekends. This means you work too hard in too short a time or always do the same training – both cause tightness at the top of your chest, and your arms get stuck in the T-Rex position. Not good for the kinetic chain.
▶ INJURY RISK Hamstring strains, groin pulls, trapped nerves around the neck.
▶ FIX YOURSELF Flexibility and variety are key. Yoga, Pilates, regular stretching, core stability moves and generally mixing – and spreading out – your training all help.



THE SHUFFLER

▶ SPOT YOURSELF You don’t lift your feet very high and have a small range of arm movement.
▶ INJURY RISK Quad cramps, IT band syndrome, shin splints, ‘runner’s knee’.
▶ FIX YOURSELF Learn to cycle your legs and lift your heel. Start left side on to a mirror and hold on to a chair with your right hand for support. Then cycle your left leg, lifting your heel towards your bum, then letting the knee drift through with your cycling foot reaching above knee height. Perform this motion for a couple of minutes, then repeat on the right side.



THE BOUNCER

▶ SPOT YOURSELF You think big strides are more efficient. Wrong. You spend more time travelling vertically than horizontally, overstride and your knees collapse inwards on footstrike.
▶ INJURY RISK IT band syndrome, adductor strain, abductor tears and pulls in the muscles down your inner thigh.
▶ FIX YOURSELF Most of the action is about pulling back rather than pushing forward. Practise your cycling action (see *The Shuffler*). This will stop the overstriding. Also do three sets of 20 lunges and squats twice a week to strengthen your glutes.



THE SLOW RUNNER

▶ SPOT YOURSELF You run slower than walking pace because you lack confidence. Moving so slowly with a running action means you’re shifting side to side and bobbing up and down instead of propelling yourself forward.
▶ INJURY RISK Tightness and strain through the shins, ankles, knees and hips.
▶ FIX YOURSELF Just move your arms more. Arm speed dictates leg speed so practise the correct motion (see *The Twister*) in front of a mirror for confidence, then apply on the run.



forgotten the arms. Your left heel is dropping. Pull back with the shoulders, don't push with the elbows. Long through the spine, keep your head up, look straight ahead." And on it goes.

I wipe a sweat-sodden forearm across my face, wondering if a style tweak can possibly be worth all this effort, but then Teri explains the logic: "It's all about taking the path of least resistance. Correct form is about making life *easier* for yourself. You know when you start swimming and you're thrashing about? You might swim a length quite fast, but it's exhausting. Later, when you learn to cut through the water smoothly, you get there faster with less effort. Running's the same. You'll have your personal issues, and you'll get rewards from looking at your style, working out where you're going wrong and correcting it."

LESSON 3 (AN AWFUL LOT OF) PRACTICE MAKES (ALMOST) PERFECT

As the next poor sap steps on to Teri's Treadmill of Torture, I ask Mike how he got into the business of dismantling and re-assembling people's running. With 30 years' experience in strength and conditioning and injury rehabilitation for football, rugby, and track and



TIME OUT
RW's Kerry (left), school founder Mike Antoniadis (centre) and coach Teri Knight (right) take a quick breather

field, he lectures at Sheffield and St Mary's universities on how correct running form can both ward off injury and improve performance. He started The Running School in 2008, believing that amateur athletes would appreciate access to similar services. It seems he was right: his clinics in London (Chiswick and Battersea), Germany, Ireland and Wales are so in demand, he plans to open up 25 more in the next three years.

Doing endless reps, he explains, stems from the fact that only by changing the way your brain sends signals to your body can you change the way you run. "Your brain tells your muscles what to do," he tells me. "As a baby, you take a couple of steps, then fall. Then you take a few more. Eventually you repeat the action so often, the body starts predicting what the brain is going to tell it and acting without conscious thought. It's the same with running. It's called a 'motor engram': a learned pattern of movement that the brain sends out as an instruction to the muscles, the ligaments, the nervous system - everything, in fact.

"So, simply put, adapting the way you run isn't easy. You are fighting against a natural instinct that has built up over a long time, so any kind of change requires a high level concentration and desire. And lots of practice." Just like many things in life - and in almost everything in running - you get out what you put in.

LESSON 4 NO BODY'S PERFECT

Today it's hill reps on an eight per cent gradient and I'm pumping my arms, flicking my heels, concentrating on landing on my forefoot and gurning with the effort. I'm still struggling to keep my elbows locked at the prescribed 90 degrees. As I push back with my shoulder blades, my forearms drop so the angle is more like 140 degrees. If this is you - and Teri reassures me that this habit is extremely common among runners - this means your arms act as rudders rather than propellers, making your running action less powerful. To counteract this problem, Teri has strapped my arms with giant elastic bands. This is mildly humiliating, but I can already feel that I'm running far more smoothly.

"ADAPTING YOUR FORM ISN'T EASY. YOU'RE FIGHTING AGAINST AN INSTINCT DEVELOPED OVER TIME"

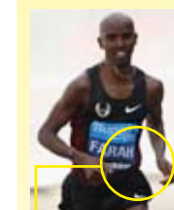
I'm almost halfway through the course and in a de-banded debrief with Mike I relay my scepticism that perfect form is attainable. "I agree," he says to my surprise. "But that's because there is no such thing as the perfect running form. Everyone runs differently and you'll never get, say, three people to run in a totally identical manner. But there is certainly an optimum way for each part of your body to move (see *The Form Guide*, left) to maximise the effects of your effort. All runners can train towards those ideals, working with their little peculiarities."

If you carry a few stylistic oddities, don't worry, you're in good company. Mike cites Paula Radcliffe, Mo Farah and Haile Gebrselassie as three examples of world class

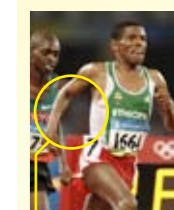
HOW THE PROS GET IT WRONG



Paula Radcliffe nods her head on the run



Mo Farah's torso rocks from side to side



Haile Gebrselassie's right arm crooks out

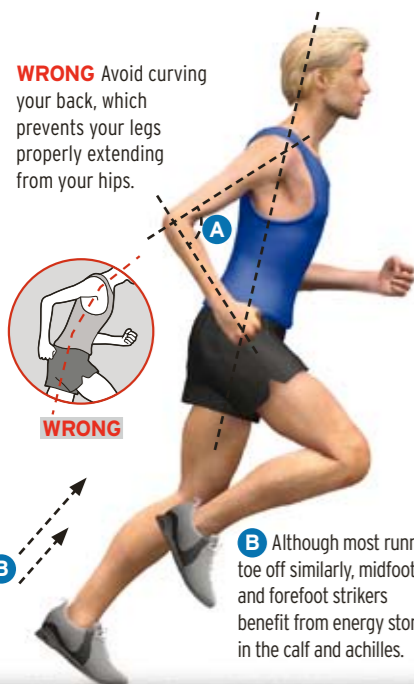
THE FORM GUIDE

There's no such thing as 'perfect' form, but improving your movements will make you faster and less injury-prone

TOE OFF

A Keep your upper torso straight, with a slight forward lean, and your arms bent at 90 degrees.

WRONG Avoid curving your back, which prevents your legs properly extending from your hips.

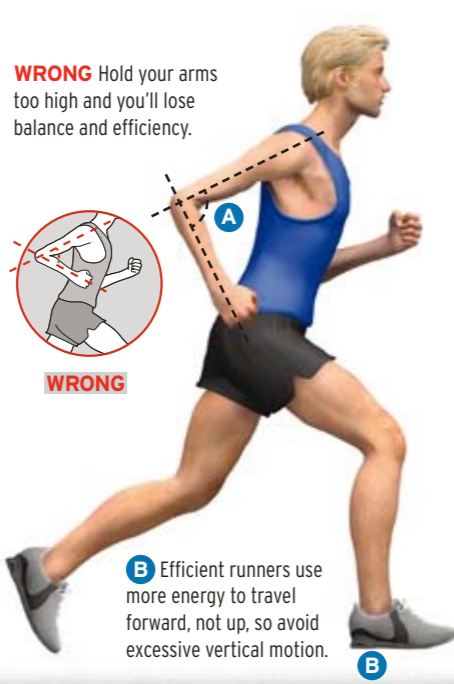


B Although most runners toe off similarly, midfoot and forefoot strikers benefit from energy stored in the calf and Achilles.

MID FLIGHT

A Keeping your arms at 90 degrees means you gain speed and save energy.

WRONG Hold your arms too high and you'll lose balance and efficiency.



B Efficient runners use more energy to travel forward, not up, so avoid excessive vertical motion.

TOUCH DOWN

A Your landing knee should be slightly bent and lower leg roughly perpendicular to the ground. Extending past that point can put on the brakes.

WRONG Landing too far in front wastes energy and can cause injury so land as close to the body as possible.



B Ground contact should be near the body's centre line.

FROM THE FRONT

A Other than your legs, look to minimise movement of body parts: your arms should swing up from the hip, not out or in.

WRONG Arms should not cross the centre line of your body. It'll reduce your efficiency.



B Knee-lift dictates speed. Elite runners barely lift their knees while jogging, but they bring their upper legs up parallel to the ground when sprinting.

PHOTOS: JULIAN ANDREWS, GETTY IMAGES; ILLUSTRATIONS: JOHN McNEIL



BACK TO BASICS
Left: Teri puts Kerry through his pelvis-strengthening paces on a backwards treadmill

JUMP TO IT
Centre: Improving footspeed on a dynamic movement board

HARD CORE
Right: Woodchopper squats build the torso



runners with distinct running form quirks. “Paula’s head-nod is a famous one, but these days it only comes out when she’s really tired. Mo’s torso rocks from side to side as he approaches the end of a race, and Haile’s right arm crooks out as a reminder of the way he used to run to school holding his books.”

LESSON 5 IT'S NOT JUST DIANA ROSS IN THE MIDDLE OF A CHAIN REACTION

Only half of today’s session is treadmill-based, the rest comprises strength and conditioning work. As I disembark the treadmill, doing an excellent impersonation of an asthmatic donkey, I see that the studio has filled up. In one corner, a 10-year-old boy performs squats with his feet on separate Bosu balls, in another, a Harlequins rugby player shows a medicine ball who’s boss, and next to me an understandably nervous-looking woman is being harnessed to a backwards treadmill.

Mike’s theory is that all runners fall broadly into seven categories: Thumper, Twister, Octopus, Slow Runner, Weekend Warrior, Bouncer or Shuffler (see which you fall into with *Which Runner are You?*, page 62). I was diagnosed as a hybrid: part Shuffler, part Twister. If, like me, you don’t lift your heels very high, then you need to work on your glutes and hamstrings to up your heel-lifts. This will enable you to cover more ground with less effort, putting less force through your feet upon impact. And if, like me, you wing your arms across the centre line of your body, you’ll also need to get up close and personal with your living room carpet to work on your core strength by doing planks, crunches and Superman curls. Your core controls torso movement, and so a strong mid-section will prevent your torso from

PHOTOS: JULIAN ANDREWS

TO CHANGE OR NOT TO CHANGE?

Some experts are still unconvinced that changing form is a good idea, so you need to weigh both sides of the running debate

▲▲ The logic here is simple: improved form equates to improved efficiency.

And improved efficiency equals less effort to achieve the same results, and therefore less injury and improved performance. In other words, more time running fast and less time spent on the sofa. It breaks down like this: our stats have shown that an average client’s stride is increased by two centimetres per stride through working on form. Over the average 22,000 steps in a half marathon, a nine-minute-miler would knock two and a half minutes off their time with no extra effort. Or five minutes off a marathon. One 39-year-old marathoner we worked with, who always pulled his hamstring at the same point in each race, went from 2:54 to 2:32 by changing nothing but his running style – and didn’t hear a peep from his hamstring in the process.”



MIKE ANTONIAIDES The Running School founder has 30 years’ experience in strength and conditioning and injury rehabilitation, and lectures at Sheffield and St Mary’s universities.

VS

▲▲ Some things can be changed about running gait, some can’t, some shouldn’t.

Landing on your midfoot is fine for lighter, quicker runners but if you’re a heavier heel-striker trying to adapt, the stress of landing with the extra weight in that position could lead to injury anywhere from the arch of the foot to your hips. Altering upper body mechanics is fine, but I believe the lower limbs shouldn’t be touched. The biggest cause of repetitive injury associated with gait and stance is leg length inequality. Ninety-five per cent of the world’s population has such inequality and this causes pelvic misalignment, which can lead to injury. The single best way to make your legs carry your upper body efficiently is to identify your shorter leg and do something about it, starting with a cheap insole from your chemist and moving up to an orthotic if necessary.”

CLIFTON BRADELEY The Asics PRO Team podiatrist has 21 years’ experience in clinical biomechanics, and specialises in running injuries. He has treated over 15,000 athletes in his time.



twisting as you swing your arms while you’re running.

As I was beginning to understand, running isn’t all about running: “The additional training – the non-running stuff – is where runners typically fall down,” says Mike. “They think just running will make them stronger. But you need to strengthen the entire body, because a weakness in one area will break the kinetic chain.”

It sounds vaguely like a death metal band, but the kinetic chain refers to the fact that everything in your body is interlinked. In order for one part to be working efficiently, all parts must be working efficiently.

Remember the song about the knee bone connecting to the thigh bone and all that? Well, nowhere is that more relevant than in terms of proper running form.

Much like millions of other runners all over the world, my days are spent sitting at a desk. Over time, says Teri, this switches off your rear muscles – your glutes, hamstrings and calves – and causes your lower back to tighten. When you then try to run, you’re ‘front-loaded’: pushing forwards instead of backwards with the arms, and punching through with the knees instead of pulling back with your heels and allowing your legs to drift back up and around. Your rear muscles aren’t strong enough to counter this, so you naturally develop a shuffling action – which leads to getting nowhere fast, and could eventually result in injuries such as iliotibial (IT) band syndrome and shin splints.

This is why it’s so important to increase your awareness of how your body actually works: it’s the key to understanding, re-examining and adapting your

running form. The chief lesson being, to quote the highly respected US coach Mark Wills-Weber, “Running is relatively simple, but it isn’t easy.”

LESSON 6 STAY IN IT FOR THE LONG RUN

I’ve been naughty. Sessions should be weekly, but I’ve skipped a month before my final session. Part of the hiatus was spent prepping for the LA Marathon, where I road-tested my spangly new form with triumphant results. But since the race, I’ve committed the cardinal sin of not working on my form. Still, I jump confidently on to the treadmill. It feels all right. But after a few seconds I hear, “HEELS! What on Earth is your left arm doing?” As the rep finishes there’s silence.

And so the final lesson: diligence is essential. In three months I’ve learnt a better ‘movement pattern’ and have shown I can apply it over a long distance. But for permanent changes to your motor engram, Mike says,

FOR ONE PART OF YOUR BODY TO WORK EFFICIENTLY, ALL PARTS MUST BE WORKING EFFICIENTLY

runners need to work on form four times a week for around nine months. “For many people who don’t have good form, it isn’t because they can’t do it, it’s because they’ve never been shown how,” he says. “With others, they know but don’t practise it – like you. You can lose form just like you lose fitness.” Determined not let all my hard work go to waste, I announce that I’m ready to resume training. “How about next week? No point wasting time,” says Teri with a wolfish grin. 🐺

For more on *The Running School*, visit runningschool.co.uk



MARTIN HAINES

The way we exercise and work has changed in the last few generations. Our bodies were designed to be hunter/gatherers. Our very physical make-up enables us to hunt, escape, harvest and gather by performing an almost unlimited number of movements - walking, running, throwing, bending, twisting and turning. As the technological revolution has enveloped our lives, these tasks are no longer necessary and our bodies have begun the process of de-conditioning in biomechanical terms. Problems arise when we then ask our bodies to move and perform exercises in this biomechanically de-conditioned state: our bodies become adept at compensating for fundamental biomechanical issues, like a rotated pelvis, leg length discrepancies, tight thoracic spines, stiff sciatic nerves and many others. All of these are significant factors that explain why we can get pain, despite being 'fit'.

Repetitive motion

There are pros and cons to any sport or activity, but on a balanced scale running is probably good for us. In fact most exercise is probably good for us, but consider this - where our muscles were once responsible for performing a variety of different movements throughout the day, they are now performing repetitive movements when we work on our laptops or larger repetitive movements when we are out training. The body does not respond well to repetitive movements; nerves in particular go through a process of de-conditioning. De-conditioning is a mechanical phenomenon where the nature of structures (in

this case nerves) actually changes and as they do, your muscles go into a protective spasm. Remember, this is while performing exercises, and this consequently does not allow us to move freely, and ultimately can be another reason for many of us having pain despite being fit.

Predisposition to injury

As a runner you are predisposed to injury at a number of different levels and below you can see the loop that runners commonly go through from pain to returning to training (and indeed working through pain) and back again.

WHO TAUGHT YOU HOW TO RUN?

The Running School's Mike Antoniadis explains

"No one!" is the answer that most people will give, "I just run."

The problem is that many people who "just run" find it painful every time they try to run more than 20 minutes. I have news for you... running doesn't have to be painful! Most of the injuries that runners get are because of landing shock. The running style that many adopt is very inefficient and causes stresses and strains on the body, which causes the majority of runners, about 65 per cent of them, to get injured every year.

THE REASON? MOST HAVEN'T BEEN TAUGHT HOW TO RUN.

Running, and running fast, is a skill and just like any other skill it can be taught and it can be developed to a high level. Through using some basic techniques you too can get enjoyment out of running.

SO, IS THERE SUCH A THING AS 'PERFECT RUNNING TECHNIQUE'?

No, is the short answer, as we are all made differently. But there is a perfect running technique for each individual and their body shape. Muscle imbalances and previous injuries can change the biomechanics of the arms and legs and we need to re-teach the body how work efficiently again.

START IMPLEMENTING CHANGES TO YOUR TECHNIQUE!

FEET: The feet should be landing under your body (centre of gravity) not ahead of your body. Landing further ahead of your body means you are over-striding, which causes a breaking action.

LANDING: You must land lightly on your feet. The best and most efficient way is to land on the balls of your feet. But this is not for everyone and if you are a heel-toe runner, then practise landing lighter on the ground to minimise the time you are on the ground. If you want to change to running on the balls of the feet, then you need to practise 10 minutes at a time to get used to it.

LOWER LEG CYCLING MOTION: When your foot leaves the ground, bring your heel up towards your backside to contract the hamstring (back of your thigh) and your gluteus maximus (your bum muscles). This creates a cycling motion - shortening your stride length.

ARMS: The co-ordination of the arms with the legs is the part that will eliminate the bounce and get you moving forwards rather than upwards. The arms should be bent at the elbow at about 90 degrees and the movement should be backward and forward.

These are not instant fixes, but you can change your running technique and run more efficiently through practice. It should take about five or six x 45 minute sessions to change your technique. Do short runs of 20-30 seconds at a time. Try incorporating one change at a time and then at the next training session make another change until it becomes fluid.

Mike Antoniadis is the founder and Performance Director of The Running School@. www.runningschool.co.uk