

Make like a mountain goat on the trails. It just takes strength work and practice

Trail running guide at Girls on Hills and expert in proprioception Dr Keri Wallace looks at the role of proprioceptive training in preparing the body for hitting the trails

# THE SIXTH SENSE

Always fancied having a go at trail running? Before you strike out on the hills, have a think about whether you're fit for purpose; it's not just your cardiovascular fitness that will take a hit from the ups and downs of trail running.

The main difference between road running and trail running is the surface we run on. Tarmac may be hard and unforgiving, but at least it is stationary. When we run on trails, the ground underfoot can be soft, loose or unstable. This requires a lot more mental processing, and yet most of us can do it almost instinctively – thanks to proprioception.

'Proprioception' comes from a Latin word meaning unconscious perception of movement. It is the sixth sense by which we unknowingly track the position and movement of our joints, ligaments, muscles and tendons relative to our body at all times. Signals »

from specialised nerve cells (sensory receptors) in our muscles, skin and joints encode and feed back this information to our central nervous system. Here, we instantly compute how to synchronise activation of our muscles to move our limbs in a co-ordinated way. When combined with our other senses, we're able to avoid obstacles and reduce impacts that can cause injury.

As runners, we fixate on strength, conditioning and form but often overlook proprioception as something we can train to improve performance. "The idea of proprioceptive training is to condition your body to control its position relative to the environment and to react quickly when something unexpected happens. It is just as

important to train this system as it is to train muscles to strengthen a particular joint," says Mariam Kilpatrick, trail runner and Chartered Physiotherapist at Physio Effect clinic, Glasgow. "One example of proprioceptive training is standing on a wobble board to improve your natural balance and proprioceptive reactions. With repetition, you'll transition from a conscious to a subconscious state. And with good proprioception comes responsiveness, precision-in-movement and greater physical awareness during running on uneven and technical trails," she says.

#### Transition from road to trail

When a runner makes the transition from road to trail, it might take a while

to adapt to the new surface. Excluding maximalist running shoes, most trail shoes have less midsole cushioning, more grip and greater precision to allow for greater 'feel' and improved reaction to the trail. Many runners find these shoes less stable at first, so lack confidence on slippery or mobile terrain. Thankfully, this feeling is short-lived and is underpinned by poor ankle-strength; the situation is improved by repeated running on uneven trails. For those runners who don't have easy access to rough trails, a comprehensive proprioceptive training programme (which can be done at home), involving coordination drills, ankle strength and balance work can help prepare the body for the move from tarmac to trail.

#### On descending

Many trail runners are nervous descenders, fearing the consequences of a 'just let go' approach to downhill running. One study claims that 14% of an individual's downhill running ability can be linked to their innate thrill-seeking behaviour, and is therefore difficult to change. But fear not, there is still plenty of room for improvement where proprioception is concerned.

Firstly, it's important not to underestimate the leg strength required for downhill running – it's much harder work than you think! Each step provides less acceleration and requires far more braking than uphill running. This results in high intensity 'eccentric contractions' in the quadriceps, where the muscles essentially act as shock-absorbers, going from extension to contraction very rapidly. Decelerating the body in this way is not only

tiring but is damaging on a micro-scale. If you're not conditioned to it, steep downhill running will result in lots of tiny tears in the muscle fibres which give rise to the feeling of DOMS (Delayed Onset Muscle Soreness) that we all know and love!

The best way to condition the body for downhill trail running is through a program of eccentric exercises which prepare the quads, in combination with regular practice of downhill running technique out on the trails (don't neglect those hills). However, the role of the lower limb in controlling the landing phase is also of central importance. Weak ankles and poor proprioception can play a huge part in undermining a runner's descending confidence. »

Train at home and then head for the hills

## TOP 5

# Tips for descending confidence

Alongside strength and proprioceptive training, try the following five ways to improve the descent

### 1 Shorten your strides

Shorter strides mean less impact force, which in turn reduces your chance of injury. You'll also have greater stability on the trail, since each foot strike will be closer to your centre of gravity.

### 2 Use your arms for balance

Hold your arms out to the sides and hold them loose when descending. Experiment with using them as a counterbalance to alter your centre of gravity and give you an advantage.

### 3 Pick the right shoes

Choose your trail shoes with the surface and terrain in mind. Choose shoes with precision and a sole-unit made of a sticky compound for rocky technical trails, but wear something with big lugs and a snug fit when it's slippery. Not having enough grip is the fastest way to knock your confidence when descending grassy or muddy trails.

### 4 Consider running poles

Poles are quite the norm for trail runners in Europe and are an increasingly common sight in the UK. They're favoured by the masses for improving stability on descending steep trails.

### 5 Run downhill

Confidence is tied to success and success requires practice. By regularly running downhill trails, you'll achieve specificity in the movement patterns (motor pathways), proprioception and strength you acquire over time – this is the most relevant kind of strength and conditioning you can do.

// Proprioception comes from a Latin word meaning unconscious perception of movement. It is the sixth sense for which we unknowingly track our position and movements //



We humans can learn to propriocept in no time – by doing a few key exercises

“If we have good ankle and foot awareness, we can descend with more confidence, assured that if we place our foot down, we can trust the stability of our body in spite of what the ground throws at us. With good proprioception, trail runners can be more confident in their ability,” says Dr Alethea Beck, Consultant in Sport & Exercise Medicine at Life Fit Wellness, Falkirk.

Analysis of race performances shows that the more technical the terrain, the bigger the time difference between competitors’ descending pace. On technical trails (where there are rocks, roots, holes or other obstacles), foot-eye co-ordination becomes paramount. Much foot-eye co-ordination can be traced back to childhood learning but there is still a lot of improvement that can be made as an adult. Co-ordination training is an area that has been subject to a lot of funding and research (mainly due to its relevance to football), so there are a lot of easy sessions available online. Mixing proprioceptive training with foot-eye coordination drills is good for gaining the stability and precision you need for downhill trail running.

“Improving your downhill running in this way will make you faster on race day, and will reduce energy expenditure and aid recovery,” says Kilpatrick.

**Injury prevention**

Ankle sprains are one of the most common trail running injuries; it’s all too easy to have a lapse in concentration, lose balance and roll an ankle.

“If we have poor proprioception, we are at higher risk of injuries of the ankles and knees,” says Dr Beck.

“Research has shown that a good level of balance and proprioception is associated with improved sports performance all the way up to Olympic level. There’s also an associated and significant reduction in the risk of lower limb injury.”

Trail running isn’t all about ankles and knees. Running on undulating and varied terrain is a full-body workout that involves activation of our core muscles as well as smaller muscles that we’re probably not even aware of.

“Performing exercises on an unstable platform stresses the synergistic and stabilising muscles around joint systems and provides a more functional form of training. It increases proprioception and neural co-ordination of the musculature, reducing postural sway and improving balance, stability and movement,” states Dr Gregory Anderson, a leading academic in unstable surface training and Dean of Science at Thompson Rivers University.

This kind of balance training has an important role to play in rehabilitation. “Previous or current injury (eg, ankle sprains), will negatively impact a runner’s positional awareness and movement precision because of the damage to the proprioceptors found in a joint’s muscles, tendons, ligaments and connective tissue. The use of balance/ wobble boards, bosu balls, pilates and yoga exercises or simply getting into balance-building positions such as standing on one leg, can help challenge and strengthen the proprioception

system as well as increasing strength and stability,” says Kilpatrick.

If you’re already injured, it’s unwise to self-prescribe taping or ankle supports to offset instability, as this reduces strength over time. Research also shows that taping or using a brace does not improve proprioception in people with ankle instability. It’s always best to find a running physio for a personalised programme for your injury.

**Women’s physiology**

Women are more prone to strains and sprains than males; anterior cruciate ligament injury rates are reported to be two to eight times higher in women than in men in the same sport.

In women, injuries often occur in the first half of the menstrual cycle and are linked to hormonal fluctuations which alter the laxity of our connective tissues. But research has shown that these changes in laxity are not associated with lapses in joint stability or proprioception. “Preventative strengthening programmes are being trialled (mainly in women’s football), which address muscle imbalances and movement patterns that put females at risk. For example, women are typically more quad-dominant, so training should focus on lower limb mechanics, including glute and core

strategies to minimise joint stresses,” says Joanna Perkins, Chartered Physiotherapist at Mumma Physio, Cardiff.

**// With good proprioception, trail runners are more confident in their ability //**

As we age, we lose efficacy in our proprioceptive pathways and we can’t control our movements with the same precision. This deterioration leads to poorer biomechanics and increased risk of overuse injuries. It is therefore even more important for older runners to follow a proprioceptive training programme to maintain coordination and slow age-related decline.

Whatever your age, distance or trail running ability, the best thing about proprioceptive training is that it’s cheap and easy to do at home. It doesn’t take long and you’ll be hitting the trails with confidence in no time. 🏃

# Proprioceptive exercises

A seven-minute workout you can do at home to improve your running on trails. Add it on to your strength work three times a week for the best results

**DYNAMIC**



## Banded running man

**TECHNIQUE**

- Mark a straight line on the ground
- Wrap a resistance band around your ankles
- Lift your knees and march on the spot without your knees and feet crossing the centre line on the ground
- Start to pick up your speed until eventually jogging on the spot while avoiding crossing the centre line
  - Aim to do this for 1 minute

**BE SAFE**

Don’t let your knees or feet cross over the line on the ground



## Step down catch

**TECHNIQUE**

- Mark a straight line on the ground
- Standing on a step or stool, stand on one leg and step down quickly on to the ground, landing on one leg (catch)
- Maintain your balance and keep your hips in line and try not to let your knee or foot cross the marked centre line
- Repeat 1 minute each leg

**BE SAFE**

Ensure your knees follow the direction of your feet when you land

## Single leg clock-face balance

**TECHNIQUE**

- Mark a cross on the ground
- Stand on a wobble cushion placed in the centre of the cross
- Reach and hover your foot over the four points of the clock-face
- Try not to let your foot touch the ground as you do so
- Repeat 1 min each leg



## Single leg with head turn

**TECHNIQUE**

- Stand on one leg on a wobble cushion
- Turn your head left to right without losing balance
- Repeat 1 min each leg



**STATIC**

Exercises by Mariam Kilpatrick, Chartered Physiotherapist at Physio Effect clinic, Glasgow, Scotland.