



# Running smoothly

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DISCUSS RUNNING INJURIES AND PREVENTION STRATEGIES

Research shows that an estimated 1.6 billion people across the world take part in running as a form of exercise or competition.<sup>1</sup>

In the UK alone, around 10.5 million people run or jog as a leisure and/or fitness activity.<sup>2</sup> It is popular with all ages for a wide variety of reasons including fitness, training, recreation, competition, health and social well-being.

However, the high injury rate still remains a cause for concern.

Running injuries can happen to both experienced and inexperienced runners – up to 79% of runners will get injured in any given year.<sup>3</sup> Understanding their cause is key to effective prevention and informing appropriate treatment. Since many runners fail to take simple steps to avoid injury, educating them about preventative strategies will decrease their chance of developing a serious problem. Sports therapy and rehabilitation practitioners have an important role to play in both the treatment and prevention of injury as well as in the long-term education of the runner.

### COMMON RUNNING INJURIES

Most running injuries occur in the lower extremity, although upper body injury, as a result of a fall, is not uncommon. Upper body injuries normally occur due to runner fatigue, change in running surface, inappropriate footwear or poor technique resulting in a fall and subsequent injury. Nonetheless, most runners tend to report lower limb injury (specifically from the knee downwards) as a result of their activity. The knee is the most common injured site on runners, followed by the lower leg, foot and upper leg. The top five injuries are:

1. Patellofemoral pain
2. Iliotibial band (ITB) syndrome
3. Tibial stress fractures/syndromes
4. Plantar fasciitis
5. Achilles tendonitis.<sup>4</sup>

Examples of common injuries are shown in the table.

### CAUSES OF INJURY

The aetiology of running injuries are multifactorial and include overtraining, non-specific training methods, previous injury history, inappropriate or poorly fitting footwear, as well as abnormal running mechanics. The risk of injury is significantly

Examples of common running injuries	
<b>Hip and thigh injuries</b>	
<b>Hip bursitis</b>	Also known as trochanteric bursitis, hip bursitis is inflammation of a bursa, or small sack of fluid, between the tendon and bone, which prevents friction. The bursa can become inflamed causing pain in the hip.
<b>Snapping hip</b>	Sometimes called dancer's hip, snapping hip is a condition in which you hear a snapping sound or feel a snapping sensation in your hip.
<b>Iliotibial band syndrome</b>	Iliotibial band syndrome results in pain on the outside of the knee that is caused by friction of the iliotibial band on the side of the knee. It is also known as ITB syndrome or ITBFS and is sometimes referred to as runner's knee.
<b>Pulled hamstring</b>	A strained or pulled hamstring is felt as a sudden sharp pain at the back of the thigh.
<b>Knee injuries</b>	
<b>Patellofemoral pain syndrome</b>	Patellofemoral pain syndrome (PFP) also known as runner's knee, chondromalacia patellae, anterior knee pain and patellofemoral joint syndrome, is a generic term used to describe pain at the front of the knee and around the knee cap.
<b>Plica syndrome</b>	Plica syndrome (also known as synovial plica syndrome) is a condition that occurs when a plica (an extension of the protective synovial capsule of the knee) becomes irritated, enlarged, or inflamed.
<b>Leg injuries</b>	
<b>Shin splints</b>	Shin splints, also known as medial tibial stress syndrome (MTSS), is defined as 'pain along the inner edge of the shinbone'.
<b>Stress fractures</b>	A stress fracture, also known as a hairline fracture, is a fatigue-induced fracture of the bone caused by repeated stress over time. Instead of resulting from a single severe impact, stress fractures are the result of accumulated trauma from repeated submaximal loading, such as running or jumping.
<b>Ankle injuries</b>	
<b>Ankle sprains</b>	A sprained ankle is a common injury where a sprain occurs on one or more of the ankle ligaments.
<b>Achilles tendinopathy</b>	Achilles tendinopathy is a condition that causes pain, swelling and stiffness of the Achilles tendon. It is thought to be caused by repeated tiny injuries to the Achilles tendon.
<b>Foot injuries</b>	
<b>Plantar fasciitis</b>	Plantar fasciitis is a disorder that results in pain in the heel and bottom of the foot.
<b>Arch pain</b>	Arch pain (often referred to as arch strain) refers to an inflammation and/or burning sensation at the arch of the foot.
<b>Blisters</b>	A blister is a small pocket of lymph within the upper layers of the skin, typically caused by forceful rubbing (friction), burning, freezing, chemical exposure or infection. Most blisters are filled with a clear fluid, either serum or plasma.

increased should any of these factors, or a combination of these factors, affect the runner. Indeed, research has noted that higher running miles per week in male runners is a risk factor<sup>5</sup> as is a history of previous injury, which will predispose the runner to further injuries.

A few specific anatomical factors

consistently appear in running injury research including cavus foot (high-arched foot); leg length difference; and muscle weakness.

Individuals who suffer with cavus foot have shown that an excessive amount of body weight is placed on the heel and ball of the foot. This foot type also demonstrates more rigidity (less flexibility/shock



## Top 10 tips to help clients prevent running injuries

- 1** Listen to your body - if you feel physically tired do not run or reduce the running duration.
- 2** Create a sensible individualised running plan - do not over-train.
- 3** Get fitted with the correct shoes based on foot type and terrain, and replace after 400 to 500 miles.
- 4** If you vary your running terrain, ensure you have the appropriate footwear.
- 5** Warm up and stretch - static or dynamic stretching pre and post running is essential.
- 6** Strength train - incorporate into your running plan and use this as a form of active rest.
- 7** Cross train, for example with rowing/cycling - this helps maintain cardiovascular fitness, but can reduce impact forces around the joints.
- 8** Visit a practitioner to help reduce the risk of injury and as part of your training and recovery plan.
- 9** Stay hydrated - ensure appropriate fluids are consumed pre, post and during running.
- 10** Nutrition - fatigue can often set in quickly if the body is not appropriately fuelled and is a factor in the onset of injury. Keep the body appropriately fuelled especially before and after running.

absorbency capacity) and subsequent higher ground reaction forces (impact forces).<sup>6</sup> This foot type has been implicated as a risk factor in PFP syndrome, stress fractures as well as general lower limb injuries.

Leg length difference has also been shown to be a factor in the onset of injury. Average leg length differences range from 0.5cm to 4cm and this difference often leads to asymmetry in gait, which is exacerbated when running. Common injuries associated with this are lower back pain, hip pain, ITB syndrome and stress fractures of the lower leg.

Muscle weakness appears to be a major factor associated with lower extremity injuries in runners. These weaknesses cause imbalances and, if allowed to persist, will place

undue stress on particular areas of the body, which may result in injury.

For example, weak and inhibited gluteal muscles can lead to ITB injury and weak shin muscles (tibialis anterior), which combined with tight calf muscles can often result in shin splints or stress fractures of the tibia. Generally, muscle weaknesses on one side of the joint, as with leg length discrepancy, cause the weak muscles to fight the tight muscles. As a result, fatigue sets in and when coupled with poor biomechanics, this

compromises joint integrity and ultimately leads to the onset of injury.

### SHOE CHOICES

The science involved in shoe design based on technological advancements around shock absorbency, material development and active control, have attempted to reduce the incidence and rate of injury in runners.

However, runners appear to be more influenced by colour, brand and look, rather than the fit and its terrain-specific suitability.

The key aspects of shoe design, and shoe choice, involve the interaction between the foot and shoe and the shoe with the surface. The modern running shoe has an array of features to help

with foot function. Manufacturers have embraced the concept that fitting the shoe to the foot and gait type decreases injury incidence.

Understanding the terrain on which an individual will predominantly be running is also imperative for correct fitting and in reducing running injury. For example, motion control running shoes for overpronators (which typically have an elevated in-step) have been developed and cushion type shoes for pes cavus/supinators,

*“Muscle weakness appears to be a major factor associated with lower extremity injuries in runners”*

which have greater shock absorber capability on the lateral aspect of the shoe.<sup>6</sup>

Increasingly popular is barefoot running in which the shorter stride and lower impact midfoot and forefoot strike (as opposed to heel strike in a cushioned shoe) are hypothesised to decrease risk injury.<sup>6</sup> However, unless the transition to this natural running preference is managed correctly, with a gradual introduction on appropriate terrain, the risk to lower limb stress fractures and associated foot injuries are increased.

### TRAINING ERRORS

It is estimated that 60% of running injuries are due to training errors.<sup>7</sup> One of the most common that is linked with an increase in running-associated injuries is excessive mileage, or a sudden increase in training.

Running experience has also been linked to running injuries. Inexperienced runners report more hamstring and knee injuries, while experienced runners report more foot problems.<sup>6</sup> Every athlete is different and responds differently to the stresses put on the body. Individual training programmes are not just recommended, but a necessity to help prevent injury.

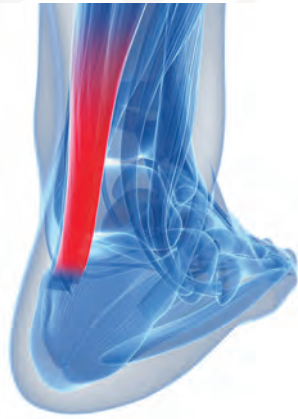
### PREVENTING INJURY

So what techniques can be used to prevent running injuries?

**1. Exercises.** Exercises to strengthen muscles (see panel for examples) are essential when trying to address/reduce muscular imbalances. These exercises should be performed two to three times a week with one to two sets of 15 to 20 repetitions per exercise.

**2. Stretching programmes.** Stretching should form part of the athlete's warm up and deeper stretching should be performed after exercise when the muscles are warm and more pliable. Encourage your athletes to stretch every day especially if they have a sedentary job.

**3. Foam rollers.** The roller should be used



## Examples of strengthening exercises

- Prone core stabilisation
- Single leg balance drills
- Lunges
- Heel walking
- Toe walking

before the athlete stretches the muscles. This is a very effective method of applying self-massage. The best approach is to roll on a tight aspect of the muscle for no more than a minute at a time.

**4. Appropriate footwear.** Running shoe selection is critical. In general, a motion control shoe is best for overpronators with flat feet. A shoe with extra cushioning is best for those with a rigid, high-arched foot. Many injuries can be related to running shoes that have broken down in terms of losing cushioning integrity and sufficient support. A pair of running shoes should be worn for no longer than 400 to 500 miles.

### 5. Sports massage.

This should be part of every runner's training programme. Sport massage/soft tissue release can be linked to three different aspects:

★ **Performance enhancement.** Tight muscles can have poor circulation and can get inhibited. Inflexibility linked to muscle tightness can cause movement pattern problems and/or lack of strength, which can prevent efficient training and performance.

★ **Injury prevention.** Tightness can be a cause for muscle strains and other soft tissue injuries. Chronic tightness can cause muscle and connective tissue inflammation, resulting in:

- Back and shoulder problems
- ITB syndrome
- Shin splints
- Achilles tendinopathy
- Plantar fasciitis.

★ **Injury rehabilitation.** When undertaken along with medical treatment and sports therapy, deep tissue work provides a faster recovery for athletes. Scar tissue will develop as the muscle heals and this can lead to pain and limited range of motion. After healing the therapist can break down the scar tissue using certain sports massage techniques. When accompanied by joint movements and assisted stretching this can help with recovery.

### AWARENESS AND EDUCATION

Running injuries are common and many variables can contribute. Modifying one or more of these variables will help reduce injury. Practitioners should be aware of the array of factors that can influence the onset of injury in runners, as well as recognise the appropriate techniques to help reduce the downtime associated with the problem.

Educating the runner in their approach to training, footwear selection, muscle strengthening and flexibility can aid in the prevention process and can return the runner to full fitness quickly, as well as reduce future injury risk. **IT**



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