

## **“INJURY PREVENTION AND CARE FOR MARATHON RUNNERS”**

The following injuries are common amongst long distance runners and are classified as ‘overuse injuries’. This means they have not come about as a result of trauma but instead from continued stress. Overuse injuries are treated very differently to traumatic injuries. A number of factors around biomechanics, muscle imbalance or training may be involved in their onset and will need to be addressed as part of the treatment. Simply resting is rarely sufficient to allow a return to running. The treatment is multifactorial and is aimed locally at the site of injury but also at the causative factors.

**Iliotibial band friction syndrome (ITBFS):** The iliotibial band (ITB) is a thick band of connective tissue that stretches from the outside of the pelvis down past the knee joint to the lateral tibial condyle (lower leg bone). ITBFS is an overuse injury which is common in distance runners. During the running gait, as the knee extends (straightens), the ITB moves forwards over the underlying lateral epicondyle of the femur. Past 30 degrees of flexion (bending) the ITB moves back over the epicondyle. Friction or impingement can occur with this repetitive action and an inflammatory reaction is set up causing pain and dysfunction.

Athletes will get an ache on the outside of the knee which is aggravated by running. Downhill or cambered running is worse than running uphill or on flat ground. The pain normally gets worse as the run continues but in the early stages may ‘warm up’ and only recur after the run. The pain is often better with faster rather than slower runs.

The management includes:

- Activity modification – avoid all pain-provoking activities and address any training errors
- Local treatment – ice, anti-inflammatory gel
- Manual therapy – soft tissue release to ITB and associated muscles around the hip and knee
- Strengthening around the gluteal muscles

**Patella tendinopathy & Achilles tendinopathy:** These two tendons at the knee and ankle can be overloaded during running which leads to microtrauma to the tendon. Unfortunately it appears that the tendons do not respond to the tissue trauma by healing in the usual way and the tendon is left mechanically inferior and painful and continued load, such as running, exacerbates the problem.

These patients will present with pain directly over the tendon and often report early morning stiffness. The symptoms are normally worse at the very beginning of the run, but will then ‘warm up’, they may however reoccur after the run.

The management includes:

- Activity modification – altering training to eliminate post-training pain and do not exercise with pain
- Manual therapy – specific soft tissue mobilisations to the tendon and soft tissue release to the calf or quadriceps if restricted in length
- Eccentric training regime

**Stress Fractures (metatarsals, tibia and hips):** Whilst most runners are aware of the potential of damage to the muscles, ligaments and tendons, fewer recognise the impact of overtraining on the bones. Bone is a living tissue which is constantly being broken down and reformed, and this process is influenced by the amount of load placed on the bone. In general, bone responds favourably to loading by becoming stronger. However, if it is not given sufficient time to adapt and remodel, then it becomes weaker and damaged. This is what happens in the case of a stress fracture. Excessive loading can either be the result of high mileage or it may be secondary to biomechanical reasons, which results in stresses not being evenly distributed throughout the bone.

If the inside of a bone is likened to the inside of honey comb, then it is easier to distinguish between a traumatic fracture (similar to what would happen in a rugby match) and a stress fracture (long distance running). In the traumatic fracture, the whole piece of honey comb is broken into 2 bits, whereas in the stress fracture only a few of the bridges separating the cells are broken. The severity of the injury depends on how many of those bridges are broken.

In long distance runners, the most commonly affected bones are the metatarsals (the long bones of the foot), the tibia (the shin bone) and the femoral neck (hip bone). Pain associated with a stress fracture is usually very well localised and can be found by pushing on a specific spot on the bone. In the early stages the pain is not severe at the commencement of running but gradually worsens the longer you run. As the bone gets more damaged, less and less activity can be done without pain. With more severe injuries, the pain may also be felt at night.

If these symptoms are felt, then a runner should seek medical advice from a sports physician or sports physiotherapist. The diagnosis can be made clinically but a scan may be used to back up and further clarify the level of damage. All bone injuries need to be rested to allow the bridges to re-build. This does not mean doing NO activity, but rather the avoidance of impact activity. An alternative training programme will be prescribed for the injured runner. The runner will also be advised how to modify their training schedule to prevent recurrence of the injury.

**Shin splints:** Shin pain is one of the most common complaints among runners. The term shin “splints” is used by runners, but this is not a good medical diagnosis. Shin pain can be the result of one or more of 3 different problems.

- The first involves damage to the actual bone itself, and this has been discussed earlier.
- The second is an inflammatory problem. The areas at which the muscles of the lower leg attach on to the bone can become strained due to overuse, and the tissues then get inflamed. The pain is not usually as well localised to one point as in bone damage, but is felt over a larger area. The pain is usually felt at the beginning of running, but tends to decrease as the runner warms up. The shins then feel sore again the day after a run.
- The third condition is called compartment syndrome. In the lower leg, different muscle groups are bound together by thick, sturdy fascia (a strong tissue, which is like gristle). If during exercise, the muscle swells up, but can't expand because this fascia is too tight, then pain may develop. The pain feels like a tight, heavy ache and increases rapidly with increased activity. The pain settles quickly once the athlete stops running. The runner may also feel weakness, numbness, pins and needles or tingling, even as low down as the foot. This is a result of excessive pressure on the nerves.

All 3 of these conditions may co-exist, since they are all related to altered biomechanics, and overuse. A therapist or doctor will identify the underlying causative factors and implement a management programme aimed at addressing these factors, and getting the runner back training as soon as possible.

### **Injury treatment**

Effective injury treatment begins with a detailed assessment and establishing an accurate diagnosis. The clinician will take a thorough history from the patient, assess the particular injury site, and do both a static and dynamic biomechanical assessment. This will involve assessing the non painful joints and muscles and may include video analysis of the runner's style.

This allows the clinician to structure a treatment and management programme specific to the individuals needs. Treatment may consist of "hands on" therapy which can include joint mobilisation, muscle stretching, taping or strapping, or soft tissue massage. In order to maintain the gains made by this treatment, the runner will be prescribed a home programme which will probably include stretching and strengthening exercises. The runner will either be advised to rest completely from running for a specific time period, to allow the injured tissues to recover, or their training programme may be modified. They will be issued with an alternative exercise programme designed to maintain cardiovascular fitness.

Since many overuse injuries are secondary to adverse biomechanics, many of the exercises are designed to help the runner "change the way they move". Therefore the exercises target both muscle strength, and the brain – because it tells the different muscles when to work. Since both of these processes do not happen overnight, the runner needs to have both patience and discipline with the prescribed programme.

In some cases the runner will be prescribed orthotics for their shoes, to help them overcome certain adverse biomechanics. In summary, treatment is aimed at ensuring the injured tissue recovers, and that it is not re-injured on return to running.

### **Post marathon recovery**

Immediately after the marathon it is important to restore lost fluids and therefore drink a lot of water. If you have never run a marathon before then you will feel very stiff and find going up and down stairs as well as walking difficult for a few days. It is a good idea to keep moving and using heat will help reduce the feeling of stiffness in the muscles.

After the marathon your rate of recovery will depend on how much running you are used to but should include a complete break from running. This may range from two weeks for the seasoned runner to a month for the new runner. It is often useful to get a sports massage, which will be aimed at the lymphatic system, to speed up your recovery a few days after the marathon.

### **Common Training mistakes**

Working in the area of sports medicine means we listen to the events leading up to patients' injuries which reveal some very common patterns. An important part of sports medicine is injury prevention and one aspect of this relates to training. This is a list of common errors that we see regularly in practice:

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- Sudden increase in training: The ideal training schedule for a new runner wanting to run the marathon is 6 months and for someone who has a running base it is 4 months
- Insufficient recovery: Rest days are important. At least one rest day should be put in each week and training should be much lighter after longer runs.
- Absence of strength training: It is important to build and maintain lower body strength and balance. So strength sessions should be built into your training week.
- Cross training: Athletes are often required to use alternative cardiovascular training methods, other than running, whilst recovering from an injury. But cross training is a very useful way of continuing to work on your cardiovascular potential without having the impact and can consequently reduce the risk of injury.

### **The importance of stretching**

Stretching can be useful for 2 different reasons. Firstly, it can be used to address specific muscle restrictions, identified as being contributory to a specific injury. Shortened or tight muscles are commonly associated with overuse injuries. The shortening may be at the same site as the injury, or in distal or proximal muscles. Muscle tightness may be secondary to neural restriction, trigger points or muscle imbalances, this needs to be corrected first if stretching is to be effective. For example, a runner who has weakness of the buttock muscles is likely to have particularly tight hamstrings. Any amount of hamstring stretching will not resolve this issue, and gluteal strengthening exercises would need to precede the stretching programme. Rehabilitative stretching needs to be done on a regular basis, as instructed by the treating clinician.

Secondly, stretching is very important as part of an injury prevention programme. Running is a very one dimensional, repetitive activity. This means that the joints and muscles are only working in very small, specific ranges of motion. This predisposes them to becoming short and tight. In general, it is suggested that the runner does a series of dynamic stretches at the beginning of a training session. This should follow a short warm up, which may be light jogging. Dynamic exercises include running with high knees, kicking heels to bottom, stride lunges, and high kicks. They should all be performed in a comfortable range of motion. This is particularly important to do before a track, interval or speed session. During a long slow run, it is beneficial to break up the run by intermittently doing high knees or bottom kicks, or side ways gallops to change the muscle use.

At the end of a training session a cool down is important, and this includes stretching of the calf, hamstring, thigh, hip and back muscles. The runner should also do some stretching of the arm and neck muscles which tend to get forgotten about. Technique is key when it comes to stretching, and runners would be advised to seek advice on the best way of stretching these muscles.

Remember that stretching can also lead to injury, if not done by the right person (hypermobile people may need to avoid certain stretches), in the right way, at the right time.

On the following pages you will find some recommended stretches to increase muscle strength and aid the prevention of injury during training for a marathon.

If you have any specific questions about Marathon training please contact us on **0870 2000 878** or [reception@puresportsmed.com](mailto:reception@puresportsmed.com)

## Strength and stretches

### Hamstrings

Lie on your back and clasp your hands under your thigh. Keep your knee pointing to the ceiling and stretch your leg until you feel a stretch (your knee doesn't have to be straight). Hold for 20 seconds and repeat 5 times



### Quadriceps:

Stand and hold onto a support. Keep your back flat and draw up your bent knee. Keep both thighs level to each other and feel the stretch in the front of the thigh. Make sure you do not allow your back to arch as this will reduce the stretch. Hold for 20 seconds and repeat 5 times



### Calves

**Straight leg:** Stand with your affected foot behind you and keep your heel on the floor as you lean forwards until you feel a stretch on your calf. Make sure your feet are both pointing straight ahead. Hold this for 20 seconds and repeat the exercise 5 times



**Bent leg:** Bring the back foot in a bit and bend the knee until you feel a stretch lower down in the Achilles tendon. You can balance out your weight on both legs as you stretch. Hold this for 20 seconds and repeat the exercise 5 times

### Lunges:

Step forward into a lunge so that both legs make an angle of about 90. Lunge down until your back knee is a few cms from the floor and then raise up. Make sure your hips are square as you go down and that your knees are in line with your feet. Repeat 3 x 15

*Progression: use hand weights*



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**Single leg squats:**

Stand preferably in front of a mirror and perform a single leg squat. Make sure your belt line stays level and that your knee bends over your second toe. Repeat 3 x 15.

*Progression: use hand weights*

Note: If your calves are tight you may find you cannot bend very far in which case you can place a folded towel under your heel. This also means you need to work hard on your calf stretches!



**Calf raises:** Stand supported and rise up on both legs, then transfer your weight over to one leg and slowly lower down. Replace the other foot so both feet are again on the floor and repeat the exercise. 3 x 15

*Progression: wear a backpack with weight in it*



**Balance work:** Stand on a wobble board and try to balance so that the base remains flat. If you are able to do this comfortably for 60 seconds then try with just one leg. If this becomes easy then try performing mini squats and then single leg squats. Do not compromise your control – it is important to maintain the correct alignment as you perform these exercises.

If you do not have a wobble board then try balancing on one foot for 60 seconds and progress to doing this with your eyes closed or while throwing and catching a ball.



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