



# Pearse Street Physiotherapy Clinic

## **Marathon Injury Prevention Advice**

Recent research into the field of preventing running injuries has provided encouraging reading for many commonly practiced strategies. While it has often been difficult to categorically state the effectiveness of one method over another, we are now beginning to get a clearer picture of what a runner can do to reduce the risk of musculoskeletal injury. Research emerging as recently as this year has started to highlight the importance of training modification, strengthening, foam rolling and recovery, all of which will be discussed below.

### **Training Load:**

Adjusting your training load throughout your Marathon preparation will be one of the most important factors in reducing your injury risk. Throughout the literature the most commonly supported method of reducing injury is in accurate managing of your running volume.

Multiple studies have examined the effect of training changes on injury risk and have found that between 60% to 72% of running injuries are due to training errors, including excessive mileage or a sudden change in routine (Van Middelkoop et al 2008. Fields et al 2010)

For those with less experience, a graduated training programme seems to prevent injuries. Special attention should be given to avoid any sudden increases in running load or intensity. There is an increasingly high risk for injury once a threshold of 40 miles/week is crossed. (Fredericson et al 2007).

Evidence also exists to suggest that partaking in an excessive amount of races, as opposed to training alone, increased injury risk. Strategies to prevent these injuries can include limiting the number of competitions in a race season and adhering to a gradual increase in mileage during training. It seems reasonable to adhere to the general guidelines of limiting any increase in time or mileage to no more than 10% per week in order to avoid injury. (Krabak et al 2013.)

### **Stretching and Strengthening:**

Stretching and strengthening should form the core of your injury prevention strategy in terms of what you can do physically.

Studies in the past have suggested that stretching has no effect on injury prevention in runners (Fields et al 2010). However these are often performed in a very acute time frame without correctly measuring the possible longer term effects of a sustained programme.

It is our experience that a comprehensive, regular stretching routine, when maintained over a number of weeks and months, will help to improve flexibility and aid muscle recovery. For those preparing for a marathon we suggest performing 10-15mins of stretching (targeting all of the major muscle groups in the legs) after each of your runs.

Strength and conditioning can protect a Marathon runner against muscle injuries when it is included at the correct time of their training schedule. It has also been found that the use of strength training as a protective measure against musculoskeletal running injuries has shown to be a worthwhile intervention. Improving leg strength can help to improve your running efficiency meaning you use less energy during your strides. (Munikani et al 2015)

We recommend performing specific strength training exercises on 2-3 days per week in conjunction with your normal running schedule. You should schedule your strength work appropriately around your running to ensure that you keep fatigue levels to a minimum prior to going for longer distance runs. It is best to consult your Chartered Physiotherapist prior to commencing such a programme in order to target weakened areas and to gain a better understanding of the exercises and techniques required.



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Weak and under active Hip muscles have an association with an increased risk of lower limb injuries such as ITB Syndrome and Patello Femoral pain in distance runners (Fredericson et al 2000) (Esculier et al 2015).

Therefore we suggest including Gluteal and Adductor strength exercises in your programme as well as targeting the Core, Quad, Calf and Hamstring muscles.

The theory behind the protective effect of strength exercises requires further research. However a logical attitude to assume would suggest that by strengthening your leg muscles you are better preparing them to deal with the stresses and pressures of running, therefore reducing the likelihood of these muscles becoming tight or damaged.

This is especially true in regard to runners who are new to the sport, having previously been inactive for a number of months or even years. In periods of inactivity the muscles in the leg will lose strength and tone. The sudden increase in running mileage on top of unprepared muscles may significantly increase injury risk.

Novice runners are at greater risk of injury when compared with experienced runners (Vidabaek et al 2015). The injury rate appears to decrease at around the 12th week of training. This would suggest that in the initial period of training, the body is only beginning to adapt and become accustomed to the new running load, therefore this is a potential mechanism for injury. As outlined above, increasing your muscle strength gradually in conjunction with a new period of training may serve to protect the body during the adaptation phase.

Due to the nature of long distance running it is best to train your muscles with lower weight, higher repetitions and a detailed focus on technique. It is not always true to say that lifting a heavier weight will have a more beneficial effect on your running. Instead of loading up with weights it is better to challenge yourself by trying to improve your form and control.

Single leg exercises (often with body weight alone) are always relevant for a long distance runner and have a high degree of transferability to your running technique. Your focus should always remain on keeping good alignment through your lower back, hip, knee and ankle. Training your body to maintain correct alignment through exercises like lunges, single leg squats and calf raises can help you to continue moving correctly at the end of your longer runs.

Pilates Classes are an excellent way of challenging the core and lower limb control. The focus of Pilates is to train the body to move correctly by using the appropriate muscle groups. During a class a runner can learn to alter harmful movement patterns and become more aware of the most efficient ways to use the body.

## **Foam Rolling:**

In 2014 a study was published suggesting that foam rolling did not improve performance but that it did reduce the feeling of fatigue after a bout of exercise (Healey et al 2014 J. S+C Research). A small study performed by MacDonald et al. (2013) displayed that foam rolling could increase flexibility without having any effect on muscle strength and performance. The same authors (2014) found that Foam rolling reduced lower limb muscle soreness while also improving flexibility in the quads and hamstrings.

These trials provide enough evidence to suggest that there are no negative effects to foam rolling and that it is certainly a worthwhile exercise if it potentially reduces fatigue and soreness.

If foam rolling can help to reduce fatigue in the muscles, this can allow you to increase your running time and volume and so over time will enhance your performance.

When coming towards the latter stages of your Marathon training, fatigue becomes a very important factor. As your run durations increase it is important to keep yourself feeling fresh. We recommend performing 20-30 minutes of foam rolling 1-2 times per week (perhaps timed after your longer runs) in order to aid with your recovery and to reduce the feeling of fatigue in the legs, therefore reducing your injury risk.



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## **Nutrition:**

There is an ever-increasing importance of nutrition in sports that feature very high training volumes and are of a long enough duration that both glycogen and fluid balance can limit performance.

Due to reductions in muscle glycogen over the course of running a marathon, optimizing carbohydrate intake and delivery is of maximal importance in terms of nutritional preparation for the race. (Stellingwerff. 2013.)

Carbohydrate 'loading' can enhance marathon performance by allowing the runner to run at their optimal pace for a longer period before fatiguing. For the well trained runner, this may be achieved by tapering exercise over the final days before the marathon and ensuring carbohydrate intakes of 10–12 g/kg/day over the 36–48 hours prior to the race. (Burke, 2007. Sports Medicine)

## **Sleep:**

Sleep quality and duration play a big role in the body's ability to recover after exercise. A study published in 2015 (Fullagar et al.) demonstrated that a reduction in sleep quality and quantity could result in changes to the autonomic nervous system.

The changes seen in the body due to loss of sleep mimicked those present in athletes who have been over trained. Additionally, increases in inflammatory markers following sleep loss can lead to an underperforming immune system.

This links in with the results from a 2014 study by Hauswirth et al which found a correlation between sleep loss, increased illness and over training. Conclusively, it has been shown that adolescent athletes who slept on average less than 8 hours per night were 1.7 times more likely to pick up an injury than those who slept for more than 8 hours (Milewski et al 2014)