

Are **you** up to **SPEED**

By Nina Anderson

Whether running for fitness or performance, injecting speedwork into training not only adds variety but more importantly forces the body to produce the physiological adaptations needed to enhance performance. Speed training will have you running faster than you've ever run before.

What is speed?

Speed is the balance between stride length and stride frequency (cadence).

Stride length can be measured by the amount of ground covered in each running step and there are two key elements involved:-

- **Knee lift** – the hip flexor muscles (Iliopsoas) are responsible for bringing the thigh towards the abdomen (otherwise known as knee lift). As this has a direct relationship to stride length it is important to ensure that hip flexors have enough strength to sustain knee lift in both training and racing. Regardless of running distance, to improve the strength of hip flexors

should be considered a priority. This can be achieved by using technical drills and conditioning exercises such as chinnies (both of which are detailed in issue 17/2).

- **Foot strike** – the more force applied by the foot when striking the ground the greater the propulsion forward, hence the benefits of explosive weightlifting (as featured in issue 17/3). Hill repetitions are another excellent way to develop power, and again technical drills can play a major role in combining the strength and speed of foot reactivity and so lead to an improved push forward.

Stride frequency is the quantity of running steps per minute and there are two contributory factors:-

- **Quicker touches** – the 'touch' is the time the landing foot stays on the ground and the shorter this is the quicker the athlete is transferring his body weight. Both drills and downhill running will help speed up the foot strike
- **Strength and conditioning** – whilst this has already been covered in a previous issue it is important to note that strength and conditioning is vital for foot and body stability. It will lead to the improvement of running economy and in turn speed.

Compare two athletes with different stride lengths (all other factors being equal). The athlete with the bigger stride length will cover more ground with each

step without expending a greater amount of energy. He will therefore beat his competitor. This idea could be applied to stride frequency. The runner who spends less time with his foot on the ground, (even by as little as a hundredth of a second) can therefore achieve more steps per minute than his fellow athlete and will finish ahead (again all other factors being equal). For endurance athletes these elements are particularly significant.

Although the ability to run quickly can largely be determined by genetic makeup, it can also be considered a learned skill. Speed training and the practices mentioned above encourage the neuromuscular adaptations that will in turn lead to a quicker pace. This will help a runner to achieve optimal performance.

Speed Training Sessions

Whilst there are innumerable ways to train specifically for speed, a popular and productive method is to incorporate interval sessions into the schedule. This training has periods of sustained effort followed by periods of active rest (jogging) or passive rest. By breaking up the total amount of high intensity work into smaller blocks an athlete is able to work at a higher intensity for longer. This in turn effects the adaptations needed to progress athletic performance. As with any training it is helpful to record sessions, times achieved, weather conditions etc. as these can prove extremely useful when evaluating how to advance the training schedule and monitor progress. The variables that may be applied to interval sessions are:-



- Length of run in distance or time
- Number of repetitions (reps) and/or sets in each session
- Length of rest period and whether it is jog or standing
- Speed of run which will be governed by number of reps and length of rest period

Below are examples of a variety of sessions, some of which are intervals:-

Pyramids

These are sessions of distance or time which increase and decrease with each repetition.

E.g. 1) 800m, 1000m, 1200m, 1000m, 800m (with 400m jog recovery)

E.g. 2) 90m, 120m, 150m, 200m, 150m, 120m, 90m (3, 4, 5, 6, 5, 4 minutes rest respectively). In this example the recovery lengthens in relation to the increased distance to enable the athlete to run the rep in a quicker time. You could use a shorter rest if the aim was to make the workout more aerobic (as opposed to anaerobic) or if the runner was just beginning speed work (e.g. 2 minutes' rest throughout). Obviously interval speeds would have to be reduced accordingly.

E.g. 3) Treadmill run of 3, 4, 5, 4, 3 minutes (3 minutes' rest) @ 14k/hr

Hills

Running uphill can improve running economy which in turn produces a quicker athlete. It not only strengthens the leg muscles (as they are forced to work



against resistance), but encourages an increased stride length.

E.g. 1) 8 - 10 x 1 minute up hill (use jog back down as recovery or begin when pulse has dropped to 20 beats/10second count)

E.g. 2) 2 x 5 x 100m of hill (90 seconds, 3 minutes) i.e. 90 seconds between reps and 3 minutes between sets

E.g. 3) 6 - 8 x 80 - 100m of hill (3 minutes rest) i.e. enough recovery to allow for quicker times



Key Points to Help Decrease Chance of Injury

- Training at an increased speed puts a greater stress on the body. It must therefore be assumed that a runner has already developed a solid aerobic base and a good background in strength and conditioning prior to the start of any speed training
- Ensure a gradual training progression and do not try to run too quickly too soon
- Flexibility plays a key role in running at a quicker pace
- It is essential to ensure that the hamstring is strong enough to cope with the demands of increased speed. It is the action of the hamstring engaging when the front foot plants down on the ground that helps to drive the hips through
- Complete a thorough warm up through the full range of movement at or above running speed
- Cooling down is very important as it helps to flush out lactate and toxins which accumulate during the session
- Speed sessions are of high intensity and should not be performed on consecutive days in order to help prevent injury and overtraining. It is imperative to allow sufficient recovery time in order that the physiological adaptations may take place. Recovery sessions should be of lower intensity and could consist of easy runs or steady X-training sessions

Downhill Running

This is an excellent method of increasing stride frequency using gravity - it trains the nerves to react more quickly. Because you'll probably be running on an uneven surface (grass), it is advisable not to allow fatigue to become an influencing factor, as this could lead to a lack of co-ordination and increase injury risk.

E.g. 2 x 6 x 100m down a hill with a gentle decline (walk back recovery)

Tempo Training

This is sustained running at a higher intensity than usual, but at a pace which is below anaerobic threshold (the point when your body begins to produce more energy anaerobically rather than aerobically ed). This type of session may also boost lactate threshold (the ability of your body to tolerate greater lactate build up - lactate is a body chemical that is crucial to energy production, however at high intensities its production can outstrip its rate of clearance and performance can be inhibited or curtailed ed).

Longer intervals apply and this training may be especially useful for distances of 10k upwards

E.g. 1) 1 x 25 minutes (10 minutes warm up and cool down)

E.g. 2) 3 x 10 minutes (2 minute jog recovery)

E.g. 3) 6 x 5 minutes (1 minute jog recovery)

Fartlek Training

Fartlek is the Swedish word for speed play and the term can be used to describe a run which has a number of pace variations within it. It need not consist of measured distances and may work the body both aerobically and anaerobically.

E.g. 1) a 40 minute run incorporating bursts of speed of varying lengths throughout

Strides

Strides are runs over 70 - 100m. They are performed at, or quicker than race or session pace. Ideally they should be done before a speed session, as this gets your mind and body ready for intense effort. A walk back to the starting position or 30 - 60 seconds' recovery should be adequate. They offer an opportunity to concentrate on good technique:-

- Heel pick up initiating stride
- Knee lift helping to cover more ground with each step
- Quick foot touches
- Toe-up foot strike
- Relaxation when running at speed

Stride sessions work well in an 'easy' week and those illustrated below are mostly aerobic:-



A simple exercise to strengthen the muscles in the foot is to stretch and scrunch the toes while trying to gather in a dynaband or towel

Back to backs

E.g. 1 4 x 8 x 100m (30 seconds, 3 minutes)
i.e. 30 seconds between 100m reps and 3 minutes between each of the 4 sets

E.g. 2 4 x 4 x 60m (20 seconds, 5 minutes)

Bends and straights

E.g. 1 4 - 8 laps of continuous running incorporating a slow jog round the bend and quick strides down the straight

Modification and Adaptation

As with any training the body must be constantly stressed in order to stimulate physiological adaptations. These will then help to optimize performance and progress the athletic capability of the runner.

Consequently, after completion of the same session 3 - 4 times, it is advisable to alter it either wholly or partly. With reference to the 'Interval Session' section some examples of progression are:-

- Shorten recovery and try to achieve the same times
- Lengthen recovery and try to run more quickly
- Lengthen distance of each repetition while keeping the same recovery

These are just a few examples of how sessions may be adjusted to suit the specific requirements of the individual. It is important to remember that training should always be specific to your running distance.

Track Training

There are a number of advantages to training on a track

- As it is quantifiable, progression can be monitored very easily. The inside lane measures 400m
- The flat, even surface facilitates speedier sessions
- It can be good psychological preparation for races, as to run long repetitions on a track requires mental strength
- Club track nights are usually Tuesdays and Thursdays. It can be useful to work with a training partner and/or within a group, as this can help a runner to achieve quicker session times

To find a running track and club near you go to www.runtrackdir.com

Spikes

Running spikes provide extra grip and so make it easier to run faster in both training

and racing. They are essential for races of 1500m or less where the aim is optimum performance. To race in spikes it is necessary to train in spikes. The disadvantages are that they offer little cushioning or support and can alter the biomechanics of the foot strike, load the calf, and stress the Achilles much more than when running in trainers. These factors on their own or in combination can increase the risk of injury. It is therefore sensible to strengthen the muscles in the foot and calf prior to wearing spikes, and it is also advisable to build up the wearing of them gradually. For longer training repetitions on the track heavier shoes should be worn in order to reduce the risk of injury. In addition this forces the foot to work harder to stabilize on each step. This strengthening and proprioceptive (balancing) response is always going to be beneficial. **UF**

Update of Case Study Shân Hughes (Age - 52)

	Initial	After 18 weeks
weight	110.2kg	107.3kg
% fat	47.50%	45%



Shân's training is continuing to progress slowly but steadily. The fat loss is not happening as quickly as she would have liked, but she continues to persevere. She understands that what has taken a number of years to develop will take a number of months to rectify. **'At the moment I'm usually fitting in 3 runs and a bike session each week. This is still a tricky balance with my available time as I am also working long office hours.'** She is now running for periods above 25 minutes which is very exciting as she initially struggled to complete 10 lots of 1 minute repetitions with rest in between.

You can follow Shân's programme at www.ninaanderson.com/publications.shtml

Nina has a passion for athletics and fitness. She started jogging at the relatively late age of 25, and only stepped on to the track for the first time four years later. Now, at the age of 35, she is a competitive athlete (400m and 800m). As an athletics coach she specialises in technical drills, strength and conditioning, and designing individual running programmes. Together with this, Nina works as a Fitness Mentor with a very wide range of clients.

www.ninaanderson.com



Next issue

Whether you are an experienced runner or novice, participating in races can be both challenging and motivational. In the next issue Nina offers advice on choosing the right race, how to taper, nutrition and post race training.