Strength and Stability Training for Distance Runners

By Ben Wisbey

Strength training is one of the most commonly discussed topics amongst distance runners, generating great debates with many strong opinions. Should distance runners undertake regular strength training programs?

Strength training is generally associated with hypertrophy, or the increase of muscle mass. This perception turns many runners away from ever undertaking weight training. Runners often fear bulking up, and this dictates opinions and training practices. Obviously increased muscle mass would require the runner to carry this extra weight during both training and racing, and as running does not require high force production, this extra muscle mass would be of little value in terms of performance.

A weight training program specific to running should not cause hypertrophy. If the traditional perception of strength training increasing muscle mass can be put to the side, then distance runners can benefit from a running specific strength training program.

Firstly, some ground rules need to be considered when deciding if strength training is right for you. The next step is deciding on the type of training you should do.

Being a runner, your key weekly sessions are your runs. The strength training is supplementary training, and while it is definitely of value it should never take priority over your running. When you are planning your training schedule do not place the strength sessions at times when they will lead to you being fatigued for one of your key runs. It doesn't matter so much if you are a little fatigued leading into a recovery run, but never schedule a strength session prior to a quality run session. This may mean that you can’t do strength training the day before a quality run session unless you have a solid strength training background.

It is recommended that you start your strength training slowly. The initial improvements that you experience with strength training are largely neurological. This means you improve as your body learns the skill of the exercise, not because you get sudden strength improvements. You will still get these improvements if you maintain low resistance (or small weights) during the early part of your training. If you apply high resistance, you will cause muscle damage and post session soreness, both of which are going to lead to reduced quality in the following run sessions. So start out easily with all your strength work by doing the exercises with low resistance before increasing the load over 4-5 sessions.

A minimum of two weekly sessions are required in order to get improvements in your strength and stability. This is sometimes difficult to fit in, while still ensuring you are not fatigued for your key running sessions. If you have a strength training background, you may be able to maintain your current level by completing only one weekly session, but if you are a beginner to strength training, there is little value doing less than two weekly sessions.

The golden rules of strength training for runners:
1/ Do not follow a hypertrophy program which is aimed at increasing muscle mass

2/ Weight training frequency and intensity should not cause a reduction in running volume and quality.

3/ A minimum of two weekly sessions is required to get improvements

4/ Core stability training should be the first priority in regards to strength training

Now that we have established the general rules of strength training, what type of training should be done that will aid the runner in the quest to better their performance? There are several areas that will be beneficial to distance runners, depending on their training back ground, and competition goal. These include:

- Stability training: with the focus on core stability training, this area is priority number one
- Strength endurance: the ability to continually produce small amounts of force over a large amount of repetitions
- Running specific strength and stability: running specific exercises with small amounts of resistance. Can easily be done at home with resistance tubing.
- Eccentric training: weight training which may be beneficial for novice runners or runners aiming for long events with a lot of downhill running.
- Plyometrics: explosive jumping exercises that can be used during run or strength sessions.

Stability Training

Stability training should be part of every runners training plan as it is both beneficial in terms of injury prevention and performance enhancement. The focus should be on core stability training, as this is an area where almost all distance runners can improve. Minimal equipment is needed, and sessions can be completed at home. A Swiss ball increases the number of possible exercises. This type of training is not time consuming, nor is it excessively fatiguing, thus it valuable for all runners, even those runners doing more than 6 weekly running sessions.

It is important to note that core stability training is not simply doing sit-ups to train your abs. It is about improving the strength and control of all muscles around the core and pelvic region with the aim of having good pelvic control and stability. This will allow a more solid platform to drive from during each foot strike.

Exercises should be started gently. Once the skill component of the exercise has been developed, the reps/time held should be increased. Many useful core stability exercises are static, meaning that they require you to hold a position with no movement. However, once you are able to hold an exercise for 45-60 second in a static position, it is time to start adding some movement, by doing it one legged or shifting your centre of gravity. Not only does this make it more difficult, but it can also create a better transfer from static stability into your running stability.

Using a wide variety of core stability exercises is most beneficial.

Strength Endurance

Strength endurance training is conducted with the aim of making runners able to produce high amounts of force over an extended period of time. If you prefer, you can look at it as fatigue resistance training, or training that will delay the time at which muscular fatigue sets in.

As we are trying to get improvements in running, then it is very important to make these exercises as specific to running as possible. Similar muscle groups should be targeted as well as similar movement patterns and movement speeds. As running requires multi-joint movement, then this should also be applied to your strength training. Useful exercises include leg press and squats. As not all muscle groups can be stressed adequately in multi-joint exercises, you will also need to do some single joint exercises, such as calf raises and hamstring curls.

Where possible, all exercises should be done with a single leg, so it is not possible to favour one leg. Two to three sets of each exercise on each leg should be completed. The number of repetitions per set should be quite high, generally between 15 and 25. While the resistance or weight used should be relatively low, the sets should be quite difficult due to the high number of reps being completed. As a guide, use a weight that is approximately 30 rep max, or the maximal amount of weight you could lift for 30 reps. Recovery between each set should be short so try and keep it to approximately 60-90 seconds.

Remember that for the first 4-5 sessions, the weight should be quite low as we want to avoid excessive fatigue as you adapt neurologically to the exercises.

Running Specific Strength

Apart from core stability training, this type of training is the strength training that will give most benefit to all runners. The aim of running specific training is to undertake light strength endurance work, which targets those muscles and movements patterns that are used in running. Resistance tubing is generally used to apply resistance during these exercises, and running specific movements such as the knee drive and pawback can be completed.

This form of training also provides good stability training if the athlete focuses on maintaining good pelvic position and posture while completing these exercises under load.

Due to the light resistance that is applied from resistance tubing, a large number of reps should to be completed, so aim to complete 15-25 reps on each leg for appropriate exercises. At least 2-3 sets of each exercise is required and as these exercises are not overly demanding, only minimal recovery is required between sets.

Eccentric Training

Eccentric strength training should only be completed by runners with a solid strength training background. This type of training can be very damaging on a muscular level, and soreness can be experienced for several days afterwards if the athlete has no strength background. This type of training is most beneficial for novice runners with a strength training background, as helps adaptation to the eccentric aspects of running that cause fatigue in so many novice runners.

This type of training is useful for long off-road events which take part in forests and other hilly terrain. It is also beneficial for those runners aiming for longer events, especially if the course will involve a great deal of downhill running. Again, this should only be done if the runner has a strength training background, or if the athlete feels the need for this type of work is an essential part of their goal event.

The types of exercises used in eccentric training should only be multi-joint exercises such as the leg press or the squat. The desired training effect occurs on the lowering of the weight rather than the actual lifting of the weight. Attempt to lower the weight in a slow and controlled manner. A heavy weight used should be used, and only 2 sets of each exercise should be completed, with a long rest between each. The number of reps should not exceed 12, and like the strength endurance training, single leg exercises are advised where possible.

This type of training should not be used frequently due to the damage caused and it is not recommended for most runners. If you do wish to try this type of training, it is suggested that you undertake it with supervision from an experienced strength coach. A solid strength endurance block is a pre-requisite for this type of training.

Plyometrics

The concept of explosive power improving endurance performance is a relatively new one, and one that is still not well understood. For runners, explosive power developed primarily through plyometric exercises (jumps) and sprints, can help reduce ground contact time. With each stride that you make during running, the foot comes in contact with the ground. During this foot strike braking forces are applied. This occurs in even the best distance runners. The tendons and muscles of the lower leg absorb the force from the impact. The energy is then stored in the tendons and muscles until the push-off phase of the stride, where the muscle contracts and the tendons shorten. The stored energy is then used in conjunction with muscular contractions to push the body forward during the next stride. In order to get the optimal usage of this stored energy, the delay between the absorption and release needs to be just right. In most athletes, especially endurance athletes, this time period is far longer then desired and thus a lot of the stored energy is lost before it can be released as productive energy to move the body forward.

So, imagine now that the absorption and release of this energy could be a lot more efficient by reducing the time lag between these phases. There would then be a shorter period of time spent on the ground and a greater amount of energy driving the body forward. This is the theory behind explosive training, which has been shown to improve speed, efficiency, economy, and therefore distance running performance

While explosive power training such as plyometrics can be extremely useful for all distances runners, especially those aiming for events less than 10km, it can also be dangerous if not used correctly. Plyometrics is very stressful on the tendons and muscles. When first beginning plyometrics, only basic exercises such as skipping and hopping should be used. It is recommended that a strength training program be completed before introducing plyometrics into your sessions, as this reduces the likelihood of injuries.

What type of training is likely to be of benefit to you?

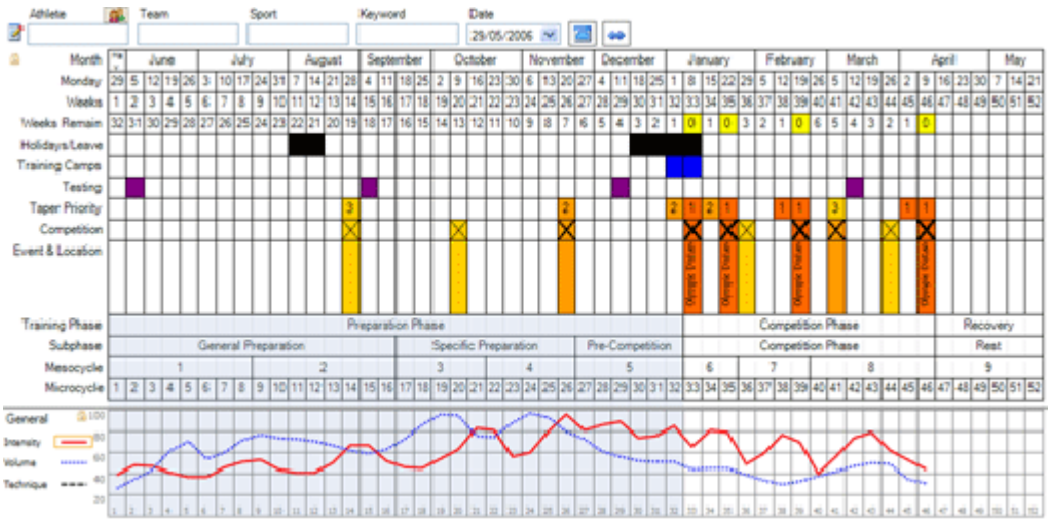
Competition Goal	Novice Runner/ No strength training	Novice Runner with Strength Training experience	Experienced Runner with no strength training	Experienced Runner with Strength training experience
< 10km	CS, SS, SE	CS, SS, ET, SE	CS, SS, SE	CS, SS, SE, PL
21-42km	CS, SS, SE	CS, SS, ET, SE	CS, SS, SE, ET	CS, SS, SE, ET

CS = core stability SE = strength endurance SS = running specific strength ET = eccentric strength training PL = plyometric training

Periodising Your Strength Training

Once you have decided on your desired methods of strength training it is now time to start determining how to work that training into your run training program, keeping in mind your competition goals.

To reiterate, your run sessions are the key sessions and strength training should therefore work around this. Just as run training is periodised with volume and intensity to meet the needs of your competition, strength training should be periodised.



Incorporate your harder or more intense strength training sessions into your easier run weeks. You need to ensure, however, that you include recovery periods in your program where both run and strength training load are reduced.

Start out by developing a general strength base. This does not have to be specific or intense, think of it like your base aerobic run development. Just like any form of training, strength training requires consistency and time for adaptations to occur, so allow at least 4-6 weeks to see initial improvements. By laying a base early in the season you will then allow for the more specific and explosive work to be introduced as the season progresses. Look at this periodisation in a similar manner to periodising a run training program.

The big difference will occur when you get into your competition period. In the 2 weeks leading into a major race or a group of races over multiple weeks, back off your strength training, only doing your core stability work which can be done up to one week prior to competition.

Many top endurance athletes are unable to continue strength training through their higher volume training blocks due to time constraints and fatigue. Likewise, if you are doing overload blocks with your running your strength training will need to be backed off. Remember the golden rule- your running training sessions are the key sessions!

If you wish to focus your strength training on the key components- core stability and running specific training- you will not need to follow a rigid a periodisation program. These sessions are less demanding physically and do not require the same recovery period or training intensity that several of the other sessions require.

Strength training for runners is a very complex issue, but hopefully this has opened your eyes to the effectiveness and methods of strength training for distance runners. The number of exercises that can be part of a strength program are vast. Choose exercises that that will work on the key areas, and focus on your weaknesses.

To help explain the vast array of exercises, and let you choose those appropriate, I recommend reading Explosive Running by Michael Yessis. This book covers many of the strength training methods discussed and is written specifically for runners.

For more information and to follow up on useful exercises try some of these recommended books:

- Explosive Running by Michael Yessis (Contemporary Books)
- High Powered Plyometrics by James Radcliffe and Robert Farentinos (Human Kinetics)

Ben Wisbey runs a coaching business called Endurance Sports Training, offering individualised training programs. For more information on programs, along with numerous running articles, go to http://www.endurancetraining.com.au