

How Strong



A thought provoking piece from Mike Winch

How Strong do your athletes need to be?

The nature of strength is always difficult to define. The strong runner, the strong shot-putter and the strong jumper clearly have little in common and yet we consistently lump strength attributes together as if we are looking for the same result for each event. This is exacerbated by coaches who are too busy to delve deeply into detailed information on strength training, and who are generally happy to accept what a few often inexperienced advisors put forward. But this can be ultimately damaging to the athlete since an incorrect bias to one type of strength instead of to another can completely distort the physical capabilities of that athlete.

Take for example the 'strength' needed by a ten thousand metre runner compared with that of the shot-putter. Are they the same? If not what is the difference?

Simply put, the word 'strength' covers many abilities, and before any attempt is made to apply 'strength' training the word itself and therefore what it refers to, must be fully understood. Scientifically we understand the needs of our athletes quite clearly. The ten thousand metre runner needs the 'strength' to carry his or her body weight around a track for twenty seven and a bit laps. The shot putter needs the 'strength' to accelerate him or herself across 2.1 metres of

circle and putt a 7.26kg ball a decent distance. They both need to be 'strong', but is it the same 'strength' that is required. Intuitively we know it is not and yet our language is inadequate in specifying the differences.

To understand what is going on we need a basic knowledge of physiology and how this operates for each event. The runner in our example is in an aerobically based event that requires the sustained application of a minimal force using a technically very simple movement. At certain stages during the race and particularly over the last few laps an injection of speed resulting from increased force application is needed, but at no time is the athlete required to generate maximum power.

For the shot putter the event requires a completely different set of competences. He or she must generate maximum force during a complex movement, culminating in an explosive one-sided effort.

The 'strength' training for each of these events must therefore be totally different, and an adequate model for that 'strength' needs clearly to be the basis for session design.

'Strength' is a generic term used to describe many dissimilar abilities. We only use the same word because historically no-one has provided us with simple alternatives.

Examples of 'strengths' include the following:

strength endurance - the ability to move a light resistance for an extended period of time
absolute dynamic strength - the maximum force that a muscle can generate and apply to create movement
absolute static strength - the maximum force that a muscle can generate and apply without

producing movement reactive strength - the maximum force that muscles can apply in response to a force in the opposite direction power - which most people confuse with 'strength', but is actually the absolute dynamic strength multiplied by the speed it can be applied

From these it is clear that different events need different 'strengths', and different 'strengths' need different training methods.

Several years ago I was able to conduct some research into the speed and force of muscle contraction using advanced hydraulic equipment. The results were very interesting. I tested every athlete that came into my gym and measured how much force their quadriceps could generate and at what speed. There was a huge difference between athletes and the results closely related to the event they performed. The marathon and long endurance athletes had slow speed and could only generate their maximum force slowly. The shot-putters were very fast (at least 50% faster) and could generate maximum force very quickly.

These measurements also were able to distinguish a good athlete in his or her field from a mediocre athlete. The tests were simple and quick, and naturally if the athlete showed a result which indicated that they could never make the grade then that viewpoint was not expressed. However it gave me confirmation of my efforts as a coach since the results fitted closely with the level of competitive performances of the athletes with whom I worked.

The other interesting result was that after general non-specific 'strength' training all athletes improved in the test and reported feeling 'stronger' while performing their event. Even the endurance runners expressed an improved feeling

of 'strength'.

This you might say contradicts what I started this article off by saying, that each event has very different 'strength' requirements. It is however a matter of degree and balance. The endurance runner would of course benefit from general heavy weight training initially because in general their bodies are light and weak and the athletes do not have any significant absolute dynamic strength base. The throwers would benefit because the events depend heavily on absolute dynamic strength. If however, the runner were to continue to try to gain absolute dynamic strength, his or her muscles would get bigger and the energy used in carrying the extra weight would reduce performance. The shot-putter on the other hand can continue to work at heavy weights and only after several years needs to move more towards specific weight training. The throwers would continue to increase dynamic absolute strength throughout their career, whereas this would be counter-productive for the endurance runner beyond the point of effective improvement with minimal weight gain.

This all sounds very complicated and abstract, but it is nevertheless at the heart of training athletes. The simplest way to assess where you are on the general weight training playing field is to apply simple tests. Some of the best are the simplest. For example standing long jump measures fairly accurately the leg power compared with bodyweight (power/weight ratio), or simply the ability to apply absolute dynamic strength as quickly as possible. The distance jumped gives a good indication of whether the athlete is strong but too heavy, light and weak or on the right line of improvement, and can be used by endurance runners as well as the other events.

This simple measurement can save a lot of wasted effort and time, as can measuring performance in three consecutive two footed 'bunny' jumps, which gives an indication of reactive strength.

As with all aspects of our sport, success comes from the correct application of training methods and understanding how much of each ingredient you need for your particular event. The essence then of 'strength' training is therefore to be able to assess when too much of one aspect of training is no longer producing positive results. It is like the old endurance training argument about which is better, long slow distance training or shorter faster runs. The answer is as always in sport, neither, you need a balance of both. It is the same with 'strength'; know what you want and how to train for each different type, apply the schedules in a balanced way and then test each element to see if it produces the right result. Also assess whether the overall performance is improving by using specific event tests. If not, change the balance, and do not be afraid of saying you were wrong and that an alteration in strategy is needed. No event or athlete needs exactly the same balance of ingredients to produce the best result.

'Strength' training can be your major path to success, but it can also be a quick road to disaster. Mike Winch