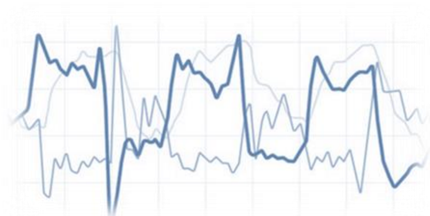

MORE POWER – RUN FASTER

Whilst hosting a talk on training earlier in the year I touched upon the subject of power development in endurance runners who are approaching, or have reached, maturation and how to maintain or increase this power output and how important that it is to not neglect training that works on power development. The subject produced a great deal of interest as for many, power output and ways of increasing it, is lost amidst the belief that just doing more running will produce results. As coaches and leaders of course we understand that a variety of training is necessary to produce results and that specific training will bring specific physiological changes so it makes sense to incorporate specific power development training into our plans and for those who have a structured plan it will probably only require some minor tweaks to ensure that this important segment of training is not neglected.

Whilst it is common to see athletes develop a good level of aerobic fitness it is also common to see physiology remaining intact and power being left behind as the miles build up. So what do we mean by power in this case? For runners and athletes power means the ability to produce quick movements whilst running and many of you will have already introduced speed training into your programmes which will invariably increase power, however what we are touching on here is a more targeted training regime to increase output and speed in a more specific way.

Whilst those who are coaching younger athletes will be familiar with having to bring power and speed back after any maturation phase it is sometimes not understood that power can be diminished in senior/veteran athletes too, not only as they age but perhaps after a prolonged injury or even after a marathon where the emphasis has been on long steady mileage. Runners that have lost power, and hence speed, typically tend to be the slow twitch athletes/runners who in turn inherently tend to be less powerful, have increased ground contact time and consequently have weaker sprint speed. They will also tend to produce lower lactate levels at each speed and have less bounce/spring in their stride etc.

Power, force output Rate of force development.
What does this all mean for runners?

When we break running down to basics, it is essentially a series of alternate single leg spring hops which produce muscle contraction and hence force. This when applied to the ground creates power and velocity to propel the athlete/runner forward. Force needs to be applied to the ground in any instance to enable any athlete/runner no matter how slow or fast to be propelled onward, the amount of force required depends on the pace that is being run or required. To certain extents the amount of force needed may be influenced by the surface being covered, but for ease the examples here are on the assumption that will be running either on the roads, track or other predictable surface. The key is to remember whatever the speed, age or level of the runner, more force will produce more speed relative to the current standard.

So, as indicated to above, the amount of force needed depends on the pace that the athlete is running at and the faster the pace the more force is required to propel the athlete forward. This force is produced mainly through leg muscle contraction and as we are no doubt aware these are broken down into concentric and eccentric isotonic contractions. During the running motion, the action of raising your thigh and bending your knee involve concentric isotonic contractions of your hip flexor and knee flexor (hamstring) muscles. As you straighten your leg to push off the ground in the motion that will propel you forward, your hip extensor (hamstrings, gluteus maximus) and knee extensor (quadriceps) muscles are engaged in concentric isotonic contractions and it is this movement that we are dealing with in this instance. Assuming that the athlete/runner is well trained and fairly strong he/she can keep going at the same pace as long as they can produce the necessary force on the ground, once they cannot impart sufficient force the pace inevitably slows and they are not able to cover the same amount of ground with the same foot strike rate. Muscle fatigue is the single cause here of the drop in force, and consequently speed, and it so stands to reason that the stronger that we can make our athlete/runner the longer he or she will be able to maintain power and speed.

Rate of force development

Rate of force development essentially refers to the speed at which force can be produced, this transfer's as power and then in running terms is the ability to move with greater speed. The more force produced the more speed that can be produced, relative of course to current form.

Faster runners generate their greatest foot strike force between .1 and .2 of a second therefore the contact time with a ground is reduced and the athlete is able to propel forward with greater speed. Power is able to be defined as force x rate = speed. In such case it makes real sense that by making our runners stronger we will inevitably increase their force capability and in turn increase the rapidity of foot strike, and again, in turn speed.

Plyometrics

For middle and long-distance runners there has been discussion in recent years that the use of plyometrics has been found to improve running economy by improving the muscle stretch shortening cycle; however using plyometrics in their most well-known form has an increased risk of injury due to the sometimes sudden increase in intensity. In such case the use of running based plyometrics is the best option especially for those who haven't undertaken a plyometric programme previously and are unfamiliar with the process.

The most specific form of plyometric training for runners is sprinting, steep hill sprints can be used as a method of power development to start with and then progress gradually to flat sprints where the emphasis shifts slowly from power development to a plyometric type effect. Some suggested sessions are detailed at the end of the article however as always it should be noted that these should be varied according to the individual, the training history, injury history, age and training age.

It should be as an underpinning of your ongoing knowledge and development in this area to bear in mind that any training that holds velocity (speed) is good, and anything intermittent will also enable your athlete/runner to continue developing power and good endurance. On the flip side of this anything that just holds a constant pace or speed for a long time will help your athlete's metabolic profile but at the same time will not be developing any great speed or power. A long slow run is very enjoyable and crucial to creating and enhancing running economy but will generally improve endurance only. The limiting factor with many runners is not metabolic but lack of "mechanical" power, if you as a coach or run leader fail to address this lack of mechanical power, and this is especially important in developing athletes, you may well have to return to this at a crucial point in the athletes/runners development later on.

Some or all of the below training sessions can be introduced gradually, and more importantly, on a regular and phased part of any ongoing training programme. The usual rules of overload adaptation and adequate rest will always apply!

John Skevington UKA Level 3 Performance Coach

Some general ideas which may be adapted and gradually increased over a planned period of time:

- 4-7 sprints on a steep hill of approximately 80 m with a full walk or jog recovery of up to 2 to 3 minutes. Gradually over the weeks reduce the steepness of the hill and ultimately the recovery in between repetitions. However it is vital that you should keep a close note on running form and extend the recoveries if this starts to diminish.
- 4-8 60-80 m "gear changes". Set out a series of markers and gradually change gear every 20 m or so concentrating on holding really good form and leg turnover. To ensure maintenance of good form a recovery of up to 2 minutes is recommended.
- Plyometric training. No special equipment is required to do sets of short hops, skips, jumps and bounds. Start with one set of 10 of each preferably to begin with on a flat and forgiving and predictable surface. Set out a progressive plan over a number of weeks and gradually increase the number within each set or number of sets.
- And just to close many of you already will use skipping as part of your general warmup, this as well as being a dynamic stretch also strengthens the feet and will help improve awareness of where the foot contact is on the ground. In such case a specific set of perhaps 3-4X 30 seconds would be a perfect partner to the above plyometric programme.