

## **THE 400 SPRINT {a matter of effort distribution}**

There is no set build for a 400 metre runner, who can be of any size or shape. The athlete should however possess **good overall strength** as well as the **ability for quick fluid movement** and an ability to last the distance.

Because the 400 is an **extreme anaerobic event**, the oxygen **demand** of the muscles is so **high** that it **surpasses** the athletes **cardiovascular system (heart, blood vessels etc)** to supply an **adequate** amount of **oxygen** to the muscles. This means that when the race is over the athlete will be in **“oxygen debt”** and will be **gasping for air**. There will be a period of time after the race before the athlete can regain a **breathing equilibrium**. i.e steady state normal breathing without effort

In order that an athlete is fully prepared for this **overdrawn oxygen supply**, there should be a training programme of **anaerobic endurance conditioning**, as well as **sprint drills** to develop **power**, **good sprinting** and excellent **“bend” technique**.

The **overall concept** that the athlete must grasp is that **maximum sprinting effort** must be carried out whilst **staying as relaxed as possible**. This is the aim of all the training that the athlete undertakes in the summer and in the winter months.

The athlete must be able to **last** a full 400 metre race. There is no way that she/he can run the full distance **“flat out”**. There must be a period of **relaxed “coasting”** without losing too much speed. How to do is problem. ??

## **TECHNIQUE OF EFFORT DISTRIBUTION**

It is necessary to begin the race with an **aggressive sprinting full out effort** from the blocks. The athlete will feel when **maximum full speed** has been reached, say at 50 metres. At this point the athlete will need to **ease back slightly** without losing too much speed. The back straight should be **“coasted “** at a speed just **below max** effort. This rhythmic part of the run is designed to reach the 200 metre mark in a **predetermined** time. Ideally, this **time differential** should be not less than 0.5sec. and not more than 1.5 secs. faster than even pace. i.e. 25 sec. plus 25sec is even pace for a 50 seconds 400. The term **time differential** demands more explanation:-

- [This subject of the differential between the first 200 and the second 200 is very important. Let us take two world class athletes and their best 400 metre times, and then break them down to fully understand what we are trying to do. The world record for 400 metres was 50.0secs in 1908 .By 1999 the record had improved to 43.18 secs by Michael Johnson of the U.S.A. If Johnson ran even pace he would have run 21.59secs for each 200 metres. This he did not do. He ran the first 200 in 20.9secs and the second in 22.2secs. – a differential of 1.28 secs..This does not sound too fast until one realizes that the NZ record for a flat 200 metres is 20.42 (Donaldson in 1997).. So Johnson was just outside the 200 NZ record for the first 200 and then was forced to decelerate but still survived the second 200.to set anew world record.

- A similar story occurred with Jamila Kratochvilova in 1980. She set the world record of 47.99 for the womens 400 metres. At even pace this is two 200s at 23.99 secs.. In fact Jamila ran the first 200 in 23.00secs ( NZ record for 200 is still 23.13 by Kim Robertson in 1978). The Czecho then finished strongly with 24.99.[differential of 1.99secs] So Jamila would have beaten the NZ record in the first 200 metres of her 400 world record However, Jamila probably was on illegal drugs when she set the record., but still..... ]

We are now moving into the **third bend quarter** of the race and should be trying to **maintain** the same style and speed **without** very much **extra effort**. This third 100 metres is crucial to a fast time , and the athlete must concentrate on maintaining style and speed through this crucial stage whilst still decelerating.

Now there is just the final 100 metres to face, and the staggered starts are unwinding **Maximum effort** should be applied. This will entail an **increased use** of the **upper torso , shoulders and arms**. A common complaint by 400 metre runners is that **the legs lose strength** over the **final 80 metres**. When this happens one must try very hard **not to lose form** but try to finish with as much effort as possible. The **leg stride** will become **shorter** and , the **breathing will be difficult**, but the satisfaction of running a 400 completely flat out to achieve ones' personal max. is a wonderful sensation.

The **aim** of the second half of the race is to **combine speed** with **economy of effort**. What is the problem when we come to the closing stages of the 400?

Obviously **deceleration** is going to be **setting in** , and the athlete who finishes strongly will be the athlete who can fight off this tendency most successfully. In a **correctly run 400** the strong finisher is the athlete who **slows down the least**. Any runner who is able to raise her/his speed above the average at the finish has run the race badly, because her/his effort has not been distributed properly.

#### **WARM UP**

Before each training session or competition the athlete must carry out a **full warm up**. If the athlete has two or more races per meeting, then an **abbreviated** warm up may be arranged. for the second and subsequent races.

The **warm up** should be carried out in **comfortable flat shoes**. Initially a slow easy relaxed jog should be '**enjoyed**'. This may be 800, 1200 or a 1600. depending on the athlete's level of fitness. **A full range of exercises** should be completed ,**easing out and stretching all the main body parts** ( neck, shoulders, upper body, hips, upper leg, lower leg and ankles).

Now we are ready to carry out our **sprint drills** .These have **interesting titles** like "High knee marching with extension of lower leg" ."High knee skipping with lower leg extensions" "High knee running with lower leg extensions" "Seat kicks" "Sprint arm action" and "Distance hopping bounding" etc. etc. **We can work on these FUN drills when we have gained a reasonable level of fitness**.The athlete will **select** their own **personal sprint drills** and work them into their own warm up routine.

Now is the time to **spike up** and run a few **rolling sprints** to almost complete the warm up. There should be about **4 runs** -each **slightly faster** than the one before. The **final one** should be nearly **max effort and be run round a bend**. **Starting blocks** should now be set up and a few sprint starts should be run (say 80 metres) around the bend

The alignment of the blocks is important. They should be pointed at the point where the athlete intends to intersect with the inside bend line, perhaps 5 metres from the staggered startline. A **final full bend start** from blocks will be ideal. It is now time for a **relaxed timeout**. The athlete may like to lay down with feet higher than the head. Always be ready to lightly exercise prior to the call to the starters orders.

### **THE STARTING POSITION**

I will use the terms **medium start** and **bullet start**. You will find that the perfect starting position is yours alone, not one out of a text book. Practise and refine your starting position until you are happy with what you have achieved. The front block should be about 45° and the rear block should be as steep as you can handle.

Because the 400 is invariably started on the bend, the athlete will need to carefully position the blocks to ensure that contact with the inside lane line is made ASAP, but not immediately.. This means **angling the blocks** in the middle or outside of the lane to point at the inside line some five metres ahead of the staggered start line.

**On your marks** position for the **medium start** is where the rear knee is positioned against the other leg instep: the hands are some distance in front, and behind the actual start line. The athlete should then **rock** forward allowing the arms to **swing** forward of their own accord to the ground so that the fingers /thumb fall to the ground where they are comfortable.. Arms should be **shoulder width apart**, and the shoulders should be **ahead** of the hands. This will give an approximation to the correct position. The head is **not** thrown back, but positioned naturally, the eyes should be directed at a point on the track **just ahead** of the start line. The breathing should be **regularly steady**.

**On your marks** for the **bullet start** is the same as above except that the **feet are placed closer together**, the front foot being **further** from the line than in the medium start

Now we have decided on the appropriate starting position there needs to be a process to **get into the blocks**. for the serious **on your marks** situation. Over a number of years I have found this little dance move to be particularly effective--When the starter **gives the command**, the athlete should **pitter patter** with **small fast strides** to a position just in front of the start line. Then **wind** the body backwards into the blocks, **flicking** the legs out and **coiling** the body into a **good block position** ready for the next command..On the starter's "**SET**", the athlete **rocks** further forward over the hands, at the same time **raising** the hips **without** any jerky movement. The **rear leg** will not **completely straighten**, and the **hips** will be very slightly **higher** than the **shoulders**. The **rear leg** is kept relaxed, and the athletes weight is **equally supported** by **arms and legs**..Both feet are **firmly** in contact with the blocks. The

athlete's **back** and **head** form a **straight line** and the **vision is forward** and towards the ground. There should be **no tension** in the neck/shoulders area. **Stay loose**

#### **THE GUN**

At the sound of the starters gun the athlete should aim at **running away** off the blocks, working the arms **vigorously** to **counterbalance** the **explosion** of the legs. The body will be **inclined forward** for some eight metres, then the athlete will assume a more **upright** stance, so that by **40 metres** the athlete is **thoroughly** upright and **going for it**. **Leaning** into the bend will become natural the more one practices the first 75 metres of the 400.

#### **THE PICK UP**

As soon as the gun has exploded and the sprinter is in **full flight** every effort must be made to reach **maximum speed** as **soon** as possible. The arms will be working **extensively** and the **knee lift** will be increasing as the athlete **leans into the bend**. The **transition** from the starting position to sprinting speed is almost complete.

#### **FULL SPEED AHEAD**

Once the sprinter is **moving at speed**, she/he must continue working the arms. The **faster** the arms are moved the **faster** the legs will follow. The forward movement of the arm should see the hand reach **shoulder height**, and should be carried back a short distance behind the **hip** in the **backward swing**. With the **arm** action maintained at a **high level**, the sprinter must aim at **maximum speed** of leg movement. The **knee lift** will be pronounced, and the feet should point straight down the middle of the lane. Obviously in reaching this state of **forward acceleration** there have been a few things to remember, but **most importantly** the concept of **relaxation** is essential. **RELAXATION AT SPEED IS ONE OF THE GREAT SECRETS** of the physical world of competition.. **Tensing up** comes from **trying too hard**, and is like running with the brakes on – **futile and inefficient**..

#### **400 TWILIGHT ZONE**

Whilst the 400 metre sprinter must to a certain extent **isolate** her/him self mentally from the rest of the race, and from the other competitors, the athlete must be **aware** of the **relative position** of the runners in the **staggered** lanes outside. **Discipline** must be exerted **not to react** to superhuman starts from other competitors ( perhaps from the lane(s) inside). The maxim must be to **run one's own race**. The body should become a **focus** controlled by **the mind**, running at **top speed**, unaffected by outside influences. Your performance in your individual lane is your sole concern, **DO NOT be distracted** by anything or anybody outside your lane area. **Concentrate** on generating **as much speed as possible** over the **first 80 metres**, and then try running just as fast but **"coasting"** for a spell. . The 200 metre mark signifies that the third bend 100 requires as much speed as possible to be maintained. The **straight** is **"hit"** with an **explosion** of power. Of course the **illusion of increased speed** is just that – an illusion. Whilst we are trying very hard, we are decelerating in the latter half of the race, but trying to maintain a classic form – Not easy , eh?

#### **THE FINISH**

Approaching the finish line the athlete will continue aiming at **rapid rate of leg action** and full use of the **upper body** whilst maintaining the **relaxation at speed**. (No head thrown back or heroic facial expressions.) Sprint **straight** through the finish to a point beyond the line, and decelerate gradually after the line (if you have the energy) Sometimes, you will be involved in a **close finish** then **thrust** both arms behind, and **drop the head/chest** down towards the finish line. on the **penultimate** sprinting stride. It may well be that you will not be able to recover your **balance** after such a **manoeuvre**. Surely a few bumps and bruises are a small price to pay if you gain the decision and qualify for a final, or indeed win a medal..?

#### **REFLECTION**

Looking back over these notes I realize that I have gone into quite a lot of detail, and in so doing I may have turned off the younger athlete who has become lost in all the words. I hope this is not so, but if it is please come and see me and I will break these seemingly complex tasks down into more manageable bites so that sprinting progress can be made in an easier manner. Thankyou.

**Mike Marston**

#### **Memory note**

Kim Robertson was the fastest woman sprinter ever to grace the running tracks of New Zealand. She was a member of the Waitemata Athletic Club for some time, and still holds the New Zealand records for the 200m - 23.13secs set in Los Angeles in 1978 and the 400 metres - 51.60 secs set in Christchurch in 1980