Track Athletics:

Preparation Behind The Scenes

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I have lost count of the number of times that coach Hennie Kotze has told me "400m hurdles is the most beautiful event in track athletics". You only have to spend a little time with the coaches at Tuks Athletics to find that he is not the only coach who is so passionate about his event. I believe this passion and commitment is a key part of what makes it such a successful club.

As a sport scientist, my role is to provide coaches with objective information on which to base their decisions. From a biomechanics perspective, this involvement covers a number of different levels of preparation.

1. **Covering your bases**

   Elite athletes are highly specialised because each event places different physical demands on the body. However, every athlete must have a functional movement foundation if they are to maximise the benefit of the specific training and to reduce the risk of injury. Think of this as a "Performance Pyramid" – if strength, speed, power and skill are placed on a weak foundation, then long term performance is affected and the chance of injury is increased.

   To assess this movement foundation, athletes undergo a Functional Movement Screen. This will expose any major flexibility and mobility limitations, and identify asymmetries. Elite, recreational and even non-athletes should be able to perform the movement screen without major compensations.

   As you'd expect, most of the elite sprinters and hurdlers that we deal with have solid movement foundations. However, there are occasions when we pick up something that needs attention, whether it's after an injury or simply because of years of bad movement habits. In this case, we develop a specific intervention training programme for the athlete with their strength and conditioning trainer, to make sure they get back on track.

2. **Fine-tuning technique**

   Coach Hennie Kriel often reminds me that the 100m final at an Olympic Games is a race that stops the world. Millions of people watch as the athletes compete for the title of "fastest man/woman on the planet". So often, the difference between winning the title and being an "also ran" is a matter of hundredths of a second.

   The tiniest changes to a sprinters' technique can give you an extra few hundredths of a second, and we are therefore constantly in pursuit of the optimal technique. The start is a section of the race where an athlete can lose significant time due to technical errors. We help the athlete find the optimal "set" position that will allow them to generate maximum force in the right direction

as they drive off the blocks. It is essential that the foot is planted directly below or slightly behind the hips in each of the strides during the acceleration phase to maximise propulsive forces, causing the body to accelerate forwards. Body positioning, arm action and the swing leg are all important elements of technique that we assess using video analysis.

The first three strides of a 100m sprinter are completed in less than 1 second. For a coach to observe and assess the start with the naked eye, to the level of detail required at top level athletics, is exceptionally difficult. Using slow motion video feedback, we are able to identify the smallest errors and can compare the videos over time and with the athlete's performances to make sure that the changes made to the programme are having the desired effect.

3. **Racing strategies**

A precise race strategy is a requirement for success in almost all track events. There are general rules to follow when it comes to determining race plans, but each individual athlete will use slight variations to achieve their optimal race plan, which maximises their strengths.

Coach Irma Reyneke has a computer-like brain when it comes to memorising and calculating race splits for her 200m and 400m athletes. Together, we track the athletes' training and race performances and use this data to make minor adjustments to help the athlete achieve the best time possible.

In the 400m hurdles, split times at each hurdle are used to judge whether an athlete will be able to finish in the desired time. Hurdlers tend to fall into two general camps – those who are stronger from an endurance perspective, and those who more reliant on speed. An "endurance" athlete will tend to go out fairly fast and rely on their stamina to maintain their speed until the end of the race, whereas a "speed" athlete may leave something in the tank for the final sprint finish. These factors are always considered when determining an athlete's ideal race strategy.

Over the past few months, coaches and athletes have been putting in the hard pre-season work, using objective information provided by sport science support staff to guide their training. The track and field athletics season is now upon us and I, for one, can't wait for it to get going!