

CLEARANCE TECHNIQUE DIFFERENCES IN THE HIGH AND 400M HURDLES

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BASIC TECHNIQUE

The clearance position across the hurdle top is affected by a number of factors and effective clearance is determined at the take-off. Favorable qualities here are speed, body height (particularly for men's high hurdlers), flexibility and coordination. These qualities allow for a good thrust at the take-off, due to a slightly shorter last stride, and a high and fast pick-up of the lead leg knee. The body will be projected almost horizontally with a lean across the hurdle, as the fast knee and the thrust result in a good split position.

As the leading leg is lifted, the foot should be kept pointing upwards. With the foot down, the lead leg will lock prior to the heel reaching the hurdle. In the words of Brent McFarlane:

- "If this action is held during the clearance, a delayed landing will result. The lead knee should cross the hurdle in a slightly flexed position to ensure an efficient and fast cut-down and landing."(1)

The hips and shoulders are kept square to the front from the take-off to the landing. The speed of clearance is determined by the lead leg speed. As the lead leg is lifted, the opposite arm is pushed forward in a position parallel to the lead leg. As the trail leg is swept through late, but fast, with the lower leg folded behind, the leading arm is brought down and around the trail knee. This occurs at the same time as the lead leg is on the downward path and the trunk is rising. The trail arm, tucked in beside the body in a normal sprinting position, comes forward with the trail leg. The trail leg knee continues its sweep until it is in front of the body.

The arms do much to keep control and balance the body. They should be bent at the elbows and kept as close to the body as the hurdling action allows. The leading arm is of particular importance.

Its elbow should lead the movement on the backward sweep to avoid a straight arm sweep that is difficult to control. If the hand continues on a wide backward

path, without being brought into the side of the body, the hurdler will twist to the lead arm side on the landing.

TECHNIQUE DIFFERENCES

The above is a description of a normal hurdling action. What differences then occur between men's high hurdles at 106.7 cm and men's 400 metres hurdles at 76.2cm in height? Generally, the technique of the hurdle clearance is similar but due to the different hurdle heights certain modifications occur.

For any athlete, the higher the hurdle becomes, the greater the lean required over it. This is to keep the flight path of the centre of gravity over the hurdle as horizontal to the ground as possible. Because the women high hurdler's centre of gravity is usually above the hurdler's height, they do not have to lean as much as the men do for their high hurdles event. With lower hurdles the use of the lead knee and the trail knee is also not as great as for the high hurdles.

The arm action of the women high hurdlers tends to move more across the body than for the men. The men need to get the lead arm well forward to assist the drive at the hurdle. The women do not need this arm extension and tend to take the forearm across to the mid-line of the body, ready to whip it back down around the trail knee. The upper arm remains parallel to the lead leg and should not be pushed across the body.

With the low hurdles at 76.2, the centre of gravity is well above the barrier. There is no need for an aggressive body dip to clear these hurdles. The only lean required is, good sprinting technique. Thus, for low hurdles the legs need to be raised only slightly for the clearance to be effective and it is not necessary to bring the trail knee to hip level. Therefore hip flexibility is not of as important as it is in the men's high hurdles and, to a lesser extent, the women's high hurdles.

The men's 400m hurdlers are not as vigorous in their action as the high hurdlers because the economy of the effort becomes an important factor. The clearance technique is somewhere between that of the high and the women's 400m hurdles. Less body lean and flexibility is required than for the high hurdles but the lead arm still reaches forward to aid the lean across the barrier.

PERFORMANCE STUDIES

The performances in 400m hurdles and how to improve them has been the subject of scrutiny of a number of studies and the results are of interest to every coach and athlete involved in this event. Dolgij of the U.S.S.R. (2) for example, in an attempt to establish basic performance factors that will lead to the most effective training methods, studied the performances of world record holders from 1962 to 1976, as well as Soviet athletes in the 400m hurdles.

He noticed the similarity in the 110m hurdles times of Hemery, Akii-Bua and Moses, as well as the U.S.S.R. record holders Litujev, Anisimov and Sokomorochoy. These athletes all clocked times between 14.3 to 13.5 seconds for the high hurdles leading to the conclusion that “their high hurdling ability obviously allows for an easy clearance of the lower obstacles in the longer race” (3).



SOKOMOROCHOV
One of several USSR 400m hurdles record holders who used his high hurdles ability successfully over the lower obstacles in the longer race.

Dolgij also compared the results of physical performance components of the hurdlers and found that the specialist high hurdlers had a superior level of performance capacities. The analysis showed that, although performers in the two events had a fairly close average speed, the development of power differed considerably. The high hurdlers were superior in strength and power.

Most interesting were the differences in jumping power, where the high hurdlers averaged 15.4cm better jumps in the standing long jump, 26.6cm in the standing triple jump, 49.6cm in the long jump and 12cm in the high jump. The results were based on 50 hurdlers with times in the 49.1 to 53.9 sec. range in the 400m event and 13.7 to 14.8 sec. in the 110m event.

The 400m hurdles requires that physical fitness and hurdling technique are developed together. That is to say that technique is related in training to other performance factors, such as co-ordination, endurance, power, mobility, speed and strength. Because of this, it has been suggested that high hurdles should be an important part of training for the 400m hurdlers. To quote Bulalschnick (4): “The high hurdles make heavy demands on power development and 400m hurdlers can benefit considerably by reaching the same level”.

The same author has advanced a formula that indicates whether an athlete has reached his 400m hurdles potential. The formula appears to be reliable and assists coaches to make adjustments to the training. It is based on the number 800 divided by the sum of the average 110m hurdles and 400m flat speeds (m/sec.). Calculations have indicated that a 0.1 sec. improvement in the 110m hurdles time allows for a potential improvement of 0.18 sec. in the 400m hurdles.

An improvement of 0.1 sec. over 400m flat, on the other hand, will only give a 0.06 sec. improvement over the 400m hurdles. An improvement over the high hurdles is therefore potentially worth three times the same improvement over 400m flat. This does not mean that the 400 flat times can be disregarded but places the importance of the high hurdles in the proper perspective.

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