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Lecture Title
Hurdle Races II

Script:

There are *sprint* hurdle races and *long hurdle* races. The standard sprint hurdle race is 110 meters for men and 100 meters for women. Men and women run 400 meters in the standard long hurdle race. Each of these races is run over ten hurdles and they are all Olympic events.

Other distances are sometimes run, particularly indoors. The sprint hurdle race indoors is usually 60 meters for both men and women, although races 55 meters or 50 meters long are sometimes run.

An Example of Stride Pattern

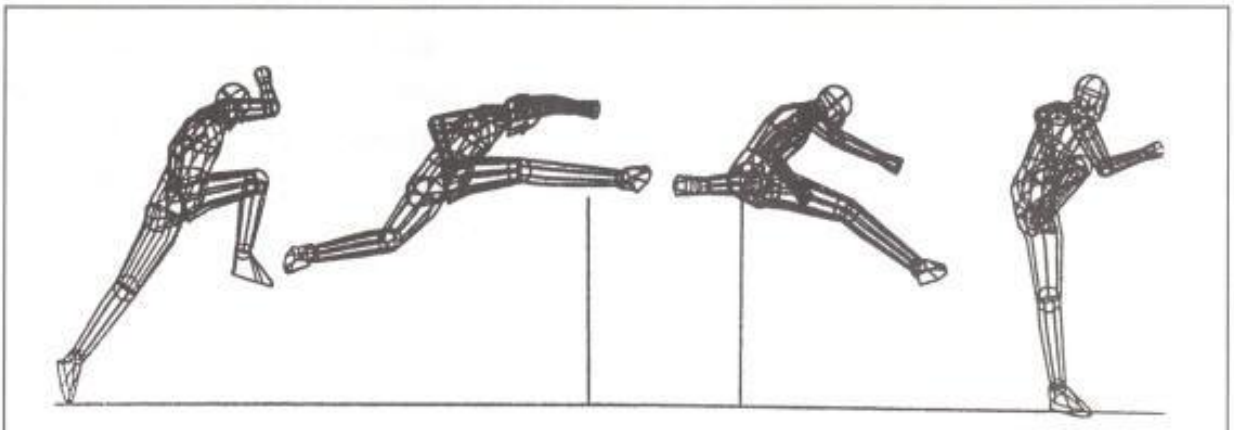
Table 1 gives guidance for a single pattern over the most important track sections. These values are not necessarily applicable to all hurdlers, since individual conditions my greatly vary. But as all hurdlers have the same space at their disposal, the latitude for an individual stride pattern is limited. Considerable deviations would therefore have negative results.

The 100 m hurdles for women

The 100 meters hurdles for women are one of the youngest events of track and field. It took the place of the 80 meters hurdle race. This decision was taken in 1968 at the Olympic Games in Mexico City. The conditions and requirements of this hurdles event take into consideration the improving performance level of women. It offers better opportunities to women who are excellent sprinter than the 80 meters hurdles did.

A technical analysis of the hurdle race for women showed that here also many technical features of the 110meters hurdle race apply. We can therefore refer to the technique in this chapter. Particular of the hurdle race for women are dealt with next.

Trail leg



- **Draw trail leg alongside body**
- **While clearing the hurdle, thigh of trailing leg is roughly parallel to the ground. Angle between thigh and lower leg is about 90 degree**
- **Toes of trail leg should not point towards the ground.**
- **Quickly strike out at ground with lead leg**

Running Rhythm

Good hurdling depends on the sprinting qualities and technical skills of the hurdler. Compared with the 80-meters Hurdles the 100 meters hurdles race requires superior running abilities. It is technically more difficult to master the approach distance and the distance between hurdles than to clear the somewhat higher hurdles.

Table 1: An example of stride pattern for the 110 meters hurdles

		Length	**Distance**
Approach to the first hurdle	**1st stride**	**0.60**	**0.60**
	2nd stride	**1.10**	**1.70**
	3rd stride	**1.35**	**3.05**
	4th stride	**1.50**	**4.55**
	5th stride	**1.65**	**6.20**
	6th stride	**1.80**	**8.00**
	7th stride	**1.90**	**9.90**
	8th stride	**1.90**	**11.70**
Take-off distance to		**2.02**	**13.72**

the first hurdle			
Landing behind the hurdle		**1.40**	**1.40**
Three-stride rhythm	**1st stride**	**1.55**	**2.95**
	2nd stride	**2.10**	**5.05**
	3rd stride	**2.00**	**7.05**
Take-off distance to the second hurdle		**2.09**	**9.14**

Approach to the first hurdle

After the start**,** the maximum speed should be reached as a quickly as possible. It is therefore of paramount importance that the 13 meters approach distance is covered with the greatest possible acceleration. All runners use 8 strides before clearing the hurdle (follow table 2).

Table 2: comparison of stride pattern in the 100 meters and 80 meters hurdles races

		100 meters hurdles (m)		**80 meters hurdles (m)**	
Approach to the first hurdle	**1st stride**	**0.65**	**0.65**	**0.45**	**0.45**
	2nd stride	**1.05**	**1.70**	**1.00**	**1.45**
	3rd stride	**1.35**	**3.05**	**1.15**	**2.60**
	4th stride	**1.40**	**4.45**	**1.30**	**3.90**
	5th stride	**1.50**	**5.95**	**1.45**	**5.35**
	6th stride	**1.65**	**7.00**	**1.55**	**6.90**
	7th stride	**1.75**	**9.35**	**1.70**	**8.10**
	8th stride	**1.70**	**11.05**	**1.55**	**10.15**
Take-off distance to the first hurdle		**1.95**	**13.00**	**1.85**	**12.00**

Landing behind the 1st hurdle		**1.10**	**1.10**	**0.90**	**0.90**
	1st stride	**1.60**	**2.70**	**1.50**	**2.40**
	2nd stride	**1.95**	**4.65**	**1.90**	**4.30**
	3rd stride	**1.85**	**6.50**	**1.75**	**6.05**
Take-off distance to the second hurdle		**2.00**	**8.50**	**1.75**	**8.00**

Running between the Hurdles

The distance between hurdles **measure** 8.5 meters. After landing behind the hurdle (1.10m) - at almost the same distance as in the 80 meters hurdle race-and after the push-off in front of the hurdle (2.00 m)**,** there strides between the hurdles. In order to cover this like a sprinter, the quality of the first stride is of special importance. The stride should the proper proportions between the three strides.**(sentence seems incomplete**) A proper of hurdle clearance depends on the correct performance of the first stride.

The Hurdle Stride

The technical details of the hurdle stride depend on the hurdle height and refer mainly to the action of the leading leg and the trailing leg as well as to the position of the upper body.

Action of Leading Leg

There is hardly any difference between the action of the leading leg for the 100 meters hurdles and that of the 80 meters hurdles. At the take-off for the hurdle clearance, the thigh is brought up level with the horizontal. Then the lower leg swings forward and upward only to a point that must be of the leading leg action consists in bracing the forward swing of the lower leg when the heel has reached the edge of the hurdle. If properly mastered, stretching at the knee joint will not be complete.

Good women sprinters should make it a point to land as quickly as possible behind ration of the landing by a downward and backward push of the thigh as soon as the foot has passed the edge of the hurdle should be on the front part of the ball of the foot with a slightly bent knee joint; good runners avoid the lowering of the heel towards the ground.

*Variant of the leading leg action.*Some top-class women hurdlers thrust their lower leg upward with such intensity that there is a complete stretching at the knee joint. In general this technique seems uneconomic, because the movement of the front leg leads so far upwards that landing is delayed. The action of the leading leg should, however, always be seen in connection with the individual height of the woman.

Most women hurdlers are so tall that it is wrong for them to stretch the leg at the knee joints. With shorter women hurdler such an action of the leading leg hardly occurs or can be compensated by a fast swinging action.

Trailing Leg Action
In order to keep a low trajectory of the body's centre of gravity, the hurdler must stretch the thigh of the trailing leg laterally away from the body. In a well executed trailing-leg action, a **woman** hurdler sweeps her trailing knee low over the top of the hurdle. In clearing the 84-cm hurdle the spread of the legs will be more pronounced than in crossing a hurdle of only 76.2 cm height. But all women hurdles let the thigh hang downward when passing the hurdle; the degree of the downward sag depends on the height of the individual. Short women hurdlers will bend the trailing leg away more from the pelvis than taller women. As soon as the knee of the trailing leg comes over the top of the hurdle, the thigh has to be brought into position for a vigorous first stride after clearance. The whole movement of the trailing leg is some-what ascending, so that at the end of this action the thigh is slightly turned upward.

Body Position
A proper flight path over the 84-cm hurdle does not require an exaggerated downward dip. Women hurdlers adopt a lower lean than in normal sprinting mainly for the purpose of getting the centre of gravity into a sound position for the landing behind the hurdle. The degree of forward lean depends on the height of the athlete; short women hurdlers usually accentuate the forward lean.

The 400-m hurdles
This is known as the most strenuous event of all hurdle races. Due to the degree of fatigue inherent in 400-m hurdling, the technique of the event is more difficult to learn.

Running Rhythm
After an appropriate number of strides, the 400-m hurdler must clear the hurdler with-out hesitation and make full use of his sprinting ability. Depending on the condition of the individual hurdler, the striding rhythm on the relatively long running sections caries. Most hurdlers cover the 45-m distance of the approach to the first hurdle with 22, only few with 21 or 23 strides. When using an even number of strides, the trailing leg is placed on the front block in the starting position. For running between hurdles the principle applies that once adopted, the rhythm should be held right through to the last hurdle, because changing the number of strides might entail an unnecessary loss of time. Hurdlers with poorly developed sprinting ability (lack of special endurance) may be forced to change the stride rhythm when premature fatigue has a deteriorating effect on speed and length of strides. Every hurdler should, however, be prepared for the challenge of a change in the stride as wind and track-conditions, may also influence the stride pattern. It is therefore recommended that the leading leg action be trained with the left or the right leg alternately and that the necessary skill and adaptability for such a functional change of the leg action be acquired by appropriate running exercises.
The stride rhythm between hurdles consists for most hurdlers of 13, 15 0r 17 strides. An uneven number has the advantage that no change of function of the legs in the hurdle stride must take place. Yet there are hurdlers who, from the very beginning or after changing the rhythm use 14 or 16 strides between hurdles and change the lead and trailing leg actions over every other hurdle. Every hurdler will have to adopt the stride plan best suited for him, depending on his stride length and sprinting ability. Most specialties, nowadays, use 15 strides between the

hurdles, giving them an average stride length of some 2.12 meters and of 3.20 meters for the hurdles stride.
Up to now the 13 strides plan with an average stride length of about 2.45 meters has rarely been adopted. For the majority of hurdlers it is too difficult to sustain and leads to premature fatigue. This is the reason why some of the top hurdlers of the world use this stride rhythm only over certain sections of the 400 meters hurdles. With growing efficiency top hurdlers may give it more consideration in the future.

Hurdle clearance

No particular technique is required for the hurdle stride in the 400 meters hurdles; it is comparable to that of the 110- or 100-m technique**; which** is the more rational depends mainly on the body height of the hurdler. Short men tend to use the 100-m technique, while taller ones prefer the technique of the 100 meters hurdle race.
The stride length for clearing the hurdle is about 3.20 meters. The take-off is about 2.0 meters in front and the landing about 1.20 meters the hurdle.

Timing in Hurdles Races

110 Meters Hurdles

Analyses of times taken **by** hurdlers at each hurdle (distance 9.14 meters) have shown (table 1) that after the start the approach and the clearance of the first hurdle, even over the first measured section (from landing behind the first up to the landing behind the second hurdle) all the athletes achieved the highest test result of the whole race.

This same result can be achieved again between other hurdles (figure 1)

The lowest values are generally measured between the 9^{th} and the 10^{th} hurdle. Only in the finishing sprint speed rises again and comes near to maximum. Each of the analyzed hurdle races reveals that as far as speed is concerned, two typical sections stand out: a first section of approximately constant speed, also called the section of maximum speed, and a second section, characterized by a marked loss in speed (the approach to the first hurdle and the final spurt up to the tape are hereby not considered). The length of the respective sections **depend** on the performance level and abilities of the hurdler, the section of maximum speed ranges from the landing point behind the first to the landing point behind the sixth hurdle (five hurdle distances). The section of decreasing speed begins behind the sixth hurdle and ends after the landing points behind the 10^{th} hurdle (four hurdle distances).

80 meters and 100 meters hurdle races

All the analyses given here refer to the 80 meters hurdles for women. They revealed up to about the fifth hurdle. No similar data meters hurdles. They are most probably similar to those of the 110 meters hurdles men.

400 meters hurdles

For good performance, the correct distribution is of vital importance, i.e. certain principle for the speed pattern must be adhered to.

In order to find out the optimal performance in the 400 meters hurdles by calculation, the following empirical values may give guidance.

1. The basis for the 400-m hurdles results is the best time clocked for the 400 meters flat. A time difference between the two distances of about 2.5 to 3.0 seconds for top performance and of 3.0 to 3.5 seconds for beginners are to be looked for.
2. Important for the final result of the 400 meters hurdles is the proper choice of the initial velocity up to meters. At this mark the intermediate time should be around 2.0 to 2.3 seconds slower than sprinting over 200 meters flat. From a chronological comparison of the two halves of a 400 meters hurdles distance it should turn out that the hurdler was only about 2 to 3 seconds slower on the seconds half than on the first.

Example

The best time of a hurdler over 200 meters is 22.0 sec. therefore his time distribution in a 400 meters hurdle race should be as follow:

For the first 200 meters (22.0+ 2.5 sec.) = 24.5 sec.

For the second 2oo meters (24.5+ 3.0 sec.) = 27.5 sec.

Final result = 52.0 sec

Intermediate Times in Hurdle Races

For all hurdle distances the time recorded for a particular section (in training as well as in competitions) is a useful means of checking the fitness of the athletes. Intermediate times will also give the astute coach clues as to the effectiveness of his work.

Lay-Out for Technical Training

Age (years)	**Approach to the 1st hurdle (m)**	**Hurdle Distance (m)**	**Hurdle Height (cm)**
7-8	**8.00**	**4.00**	**20-60**
		4.50	
		5.00	
		5.50	
9-10		**4.50**	
	10.00	**5.00**	**40-60**
		5.50	
		5.00	

		5.50	
	11.00	**6.00**	**50-76.2 (2ft. 6in.)**
		6.50	
11-12		**5.50**	
	10.00	**6.00**	**50-76.2 (2ft. 6 in.)**
		6.50	
		7.00	
	11.50	**7.50**	**60-76.2 (2 ft. 6 in.)**
13-14	**10.00-12.00**	**6.50**	**76.2 (ft. 6 in.)**
		7.00	
	12.00	**7.50**	**76.2 (ft. 6 in.)**
		8.00	
15-16		**7.00**	
	12.00	**7.50**	**76.2 (ft. 6 in.)**
		8.00	
		8.00	
	13.50	**8.30**	**91.4 (1 yd.)**
		8.50	
		8.90	
17-18		**8.00**	
	13.00-13.50	**8.50**	**76.2**
		8.90	**91.4 (1yd.)**
		8.50	**91.4 (1yd.)-100**
	13.72	**8.90**	

		9.14	**100**
		9.14	

Summary

Under easier condition hurdling can be learnt comparatively quickly by children**,** adolescents and adults. The conditions should be related to the age and the efficiency level of the learners. The object of the technical training should be to achieve harmony between the sprinting and the hurdling stride and to lead the learner step by step to competition level.