The preparation of women for the 400 metres Hurdles

Vitaly Breizer and Remi Korchemny

In this article the authors start by examining the prerequisites for selecting women athletes for the 400 metres Hurdles event. They then detail the advantages and disadvantages of the various stride patterns that can be used. Finally, they offer example drills and training schedules designed to help women athletes integrate speed and technique to optimum effect.

1 Introduction
The 400 metres Hurdles for women was first introduced as an official event in the international programme in 1978 at the European Championships in Athens, and was only recognized as an Olympic discipline in 1984 at the Games of the XXIst Olympiad, Los Angeles. Because of its relative novelty in women's sports, there remain some areas of doubt as to the optimum methods of selection and preparation of potentially successful athletes. This study will attempt to clarify some of the difficulties peculiar to this event, and to establish methods of helping and training athletes to overcome them.

2 Basic prerequisites for selection
The selection of women for the 400 metres Hurdles is a very difficult task. Coaches and specialists in Germany and the Soviet Union define the ideal athlete as tall (between 175 and 178 cm), flexible and with a basic 400 metres speed of around 50.00. (Stepanov, coach to World Record holder Marina Stepanova (URS), believes that a hurdler wishing to approach her World Record of 52.94 should be capable of running below 50 sec. for the 400 metres.) Such an athlete would be able to concentrate training efforts on the improvement of hurdling skills, and on establishing an even distribution of energy throughout the race.

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Mr Remi Korchemny worked as a sprints and hurdles coach both in the Soviet Union and in America, coaching such athletes as Valeri Borzov and Grace Jackson. He is now the USA Development Co-ordinator for The Athletics Congress.
Unfortunately, it is also likely that such an athlete would consider herself an elite 400 metres specialist and would be unwilling to change over to the hurdle discipline. Consequently, the event tends to be populated by athletes who have specialized less successfully in other track events, particularly in the 400 metres, the 800 metres and the 100 metres Hurdles.

An exception to this generalization is Sabine Busch (GER), who was the second fastest sprinter in her country in 1984 with a 400 metres time of 49.24 when she decided to confront the new challenge of the 400 metres Hurdles. However, since switching over, she - along with many other world class hurdlers, both men and women (Edwin Moses (USA), Nat Page (USA), Tatiana Zelentsova (URS) - has complained of experiencing difficulty in running 400 metres flat races. Busch, at the time of her peak performance in hurdling, could only run around 51 sec. for 400 metres.

This discrepancy is reflected in the surprisingly small time differential between the best 400 metres and 400 metres Hurdles times of most elite women hurdlers (on average 3.5 - 3.7 sec., as opposed to the 5 sec. differential between the two World Records). This general trend suggests two things: 1) that a good sprinter will not necessarily make a successful transition from the flat to the hurdles; and 2) that the presence of hurdles or barriers necessitates a rhythm and a stride pattern which, if translated directly to the flat sprint, has a detrimental effect on speed.

We will examine the various stride patterns which can be used, with their advantages and disadvantages; and then turn to drills and training methods which can help the athlete to integrate speed with hurdle skills to optimum effect.

3 Stride models

Some hurdlers, for example Fesenko (URS)(54.14) and Zelentsova (URS)(54.89), can run sub-55 sec. races using 17 strides between hurdles. However, to do this they need to take an average of 207-208 strides in order to cover the race distance. It is therefore virtually impossible to reach a high enough cadence or stride frequency to achieve a time below 54 sec.

The 15-stride model requires only an average of 176-180 strides. However, this model is feasible only for tall, physically strong athletes. The most comfortable model for many women hurdlers is 15/16 or 16 strides, but this demands that hurdle skills be mastered on both legs which is time-consuming and technically difficult.

Coaches should consider the height, build and natural running style of each individual athlete; weigh up the advantages and disadvantages of the various possible stride patterns; and finally decide upon that which is most comfortable and successful for her.

4 Stride length and frequency over hurdles

There is an opinion held by experts such as Breizer, Stepanov and Zelentsova which states that the strides taken over a 400 metres Hurdles race differ in length and frequency from those which the same athlete would normally take when sprinting. Besides making constant adjustments in preparation for the action of hurdling - attack, clearance, landing - the athlete must also adjust her rhythm and stride length between the hurdles in order to maintain the correct stride pattern at optimum speed. A 15-stride hurdler, running over 400 metres flat with the reduced frequency and increased elasticity of stride appropriate to her hurdling style, may find her final 400 metres time is 2-3 sec. slower than if she had run at normal sprinting speed. However, as fluency and rhythm are vital components of the hurdle event, an athlete should not consciously change her hurdling stride length and rhythm when training on the flat. In other words, she should be prepared to sacrifice maximum sprinting speed to a greater economy and fluency over hurdles.
The 17-stride hurdler should train over flat distances of 200-300m which she can cover with the reduced stride length and increased frequency appropriate to her hurdling style.

The following model will help athletes to judge a stride length suitable to them:

<table>
<thead>
<tr>
<th>Strides between hurdles</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stride length (in metres)</td>
<td>2.27</td>
<td>2.13</td>
<td>2.0</td>
<td>1.85</td>
</tr>
</tbody>
</table>

It is possible to minimize such problems in the preparation of world class hurdlers if athletes capable of distributing their efforts evenly over the whole race distance and of mastering an alternating leg rhythm are selected. These hurdlers can then learn subconsciously to maintain a specific stride length: this allows them to concentrate their attention upon correct judgement of the attacking distances (the last 10m of each segment).

5 Attacking the hurdles

The athlete first sends the appropriate leg and opposite arm forward over the hurdle (see photo-sequence on the following pages). The rest of the action should follow automatically. It is through correct management of the lead action that the athlete will properly judge the attacking distance. The arm should be driven forward as far as possible, whilst the opposite arm must stay close to the body without being moved backwards (7-10). This helps to keep the shoulders square and stops the trunk from twisting.

The attacking drive should resemble a door slamming. The take-off foot serves as a hinge, and the take-off leg, together with the trunk, forms a door. The lead leg should be perpendicular to the ground (3-4).

The forward-moving knee should not be brought up too high, but there should be a forceful drive effected by the supporting foot (torque) whilst ground contact is maintained. (This is known as the hinged movement, and can be achieved most effectively if the support foot is placed flat on the ground). Clearance can then take place, with an ideal leg split in the air after take-off of 100-110°.

The first step after clearance should be a long one, almost the same length as a regular running stride (13-16). This action allows a continuous, energetic run, and helps the athlete to regain the correct positioning for the execution of optimal cadence throughout the hurdles.

6 Specific drills for improving attack, clearance and first stride

The drill which will improve the efficiency of these actions is known as the '10 in and 10 out' drill. The athlete runs over a set of 6-12 hurdles set 35m apart. Tape or cones are placed at a spot 10m on each side of each hurdle. The athlete then jogs in towards the first hurdle, accelerates, clears it and strides over the 10m post-hurdle distance. These actions are then repeated over the rest of the hurdles.

If the athlete wishes to master these skills on alternate legs hurdles should be set at such a distance that an even number of strides (2, 4 or 6) have to be taken.

Although it is important that this type of specific drill be practised, training must also include longer intervals run on the flat, as well as intervals on the flat during which hurdling actions for alternate legs are imitated.

7 Training models and annual training plans

Future hurdlers should consider the race models of elite hurdlers, such as that shown in Table A, and choose one suitable to their build and capabilities to follow as a training guide (see Table A on the following page).

For each hurdling interval an appropriate time split should be selected and the number of strides to be used should be established. In training, hurdle intervals
should be run accordingly; where difficulties are experienced due to fatigue, or due to technical or physical limitations, the interval should be reduced so that the exercise can be correctly executed. To the same end the hurdle height can be adjusted. As a detailed example of suitable preparation for the 400 metres Hurdles for women, we analyse the training load of Anna Ambraziene (URS), who ran 54.02 in 1983 using a 16-stride model.

Table A: Actual running models of the world best female 400m hurdlers

<table>
<thead>
<tr>
<th>Hurdle</th>
<th>ZELENTSOVA - 54.89</th>
<th>BUSCH - 53.60</th>
<th>STEPANOVA - 53.32</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time</td>
<td>Interval</td>
<td>Strides</td>
</tr>
<tr>
<td>Start 1H</td>
<td>6.8</td>
<td>6.8</td>
<td>24</td>
</tr>
<tr>
<td>2H</td>
<td>11.3</td>
<td>4.5</td>
<td>17</td>
</tr>
<tr>
<td>3H</td>
<td>15.7</td>
<td>4.4</td>
<td>17</td>
</tr>
<tr>
<td>4H</td>
<td>20.3</td>
<td>4.6</td>
<td>17</td>
</tr>
<tr>
<td>5H</td>
<td>24.9</td>
<td>4.6</td>
<td>17</td>
</tr>
<tr>
<td>6H</td>
<td>29.4</td>
<td>4.5</td>
<td>17</td>
</tr>
<tr>
<td>7H</td>
<td>34.1</td>
<td>4.7</td>
<td>17</td>
</tr>
<tr>
<td>8H</td>
<td>38.9</td>
<td>4.8</td>
<td>17</td>
</tr>
<tr>
<td>9H</td>
<td>43.8</td>
<td>4.9</td>
<td>17</td>
</tr>
<tr>
<td>10H</td>
<td>48.9</td>
<td>5.1</td>
<td>17</td>
</tr>
<tr>
<td>Finish</td>
<td>54.89</td>
<td>6.0</td>
<td>21</td>
</tr>
</tbody>
</table>

Training plan for Anna Ambraziene (URS) for the season of 1982-83

Preparation period

October

Cross country, flexibility drills, fitness

December 6-12

M

cross country - 40 min.

T (am)

warm up + special running drills 4x60m
build-up sprint 4x70m
10x200m free striding over 200m [jog] 1x600m

(pm)

warm up + special running drills 600m
build-up sprint 2x60m
5x80m (90%) [2 min.]
flexibility drills
1x600m

W

warm up + special running drills 4x60m
build-up sprints 4x70m
3x150m [full]
easy 1x800m
<table>
<thead>
<tr>
<th>Day</th>
<th>Schedule</th>
</tr>
</thead>
</table>
| Th (am) | warm up + special running drills 4x60m  
build-up sprints 4x70m  
special hurdles - 20 min.  
10x9H in 6 steps (15m between) |
| (pm) | warm up + special running drills, 4x60m  
4x200 m [walk 200m]  
4x200m + high knee lift  
easy 1x400m |
| F (am) | warm up + special running drills, 4x60m  
build-up sprint 3x70m  
3x(5x50m) rest between reps, 2 min. between sets  
easy 1x800m |
| (pm) | warm up + special running drills 3x60m  
hurdles in place - 20 min.  
easy 1x800m |
| S (am) | warm up + special running drills 2x80m  
build-up sprints 4x70m  
8x200m (80%) - [200m jog]  
easy 1x400m |
| (pm) | warm up + special running drills 3x60m  
hurdles - 5 steps for each leg for 20 mins  
flexibility drills - 15 min.  
easy 1x800m |
| Sunday | rest |

**January 3-9**

<table>
<thead>
<tr>
<th>Day</th>
<th>Schedule</th>
</tr>
</thead>
</table>
| M | warm up + special running drills, 4x60m  
build-up sprints 3x60m  
10x200m over 400m jog (31.8-29.8 sec.)  
flexibility drills - 20 min. |
| T | cross country - 4 miles  
bounding - 120 take-offs  
flexibility drills - 20 min. |
| W | warm up + special running drills 4x60m  
build-up sprint 3x60m  
8x300m [jog 400m] (47.5-47.1 sec.)  
flexibility drills - 20 min.  
easy 1x800m  
special relaxation drills - 15 min. |
| Th | cross country - 5 miles  
fitness - (weightlifting, resistance, machines, circuits) - 90 min. |
| F | warm up + special running drills 400m  
build-up sprints 3x70m  
from standing start 10x35m (40 yards)- 4.3-4.1 sec. (first move)  
bounding and hops (130 take-offs)  
special running drills with relaxation 1x800m |
<table>
<thead>
<tr>
<th>Day</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sat</td>
<td>jog 2 miles, stretching, special running drills - 400m build up 3x70m 10x100m (13.2-12.8), 100m</td>
</tr>
<tr>
<td>Sun</td>
<td>Rest</td>
</tr>
</tbody>
</table>

**Specific preparation period**

**March 21-26**

<table>
<thead>
<tr>
<th>Day (am)</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>M(AM)</td>
<td>warm up + special running drills over 400m hurdles 70H (technique) build up sprints 4x60m 3x1H, 3x2H in 16 steps, 2x3H, 2x4H</td>
</tr>
<tr>
<td>(PM)</td>
<td>warm up, free striding 3x60m 3(3x200), rest, jog 200m between reps/12 min. between sets easy 1x600m</td>
</tr>
<tr>
<td>T(AM)</td>
<td>warm up + special running drills, 400m build-up sprints 3x60m 2(4x150) at 18.6-19.7 sec. (8 min. between reps, 15 between sets) easy 1x800m</td>
</tr>
<tr>
<td>(PM)</td>
<td>warm up + free striding 6x60m weightlifting 40 min. bounding and jumping exercises - 20 min.</td>
</tr>
<tr>
<td>W</td>
<td>warm up + build-ups 3x60m 6x300m (trail) strength exercises - 20 min. jumps 3x30m flexibility drills - 20 min.</td>
</tr>
<tr>
<td>Th(AM)</td>
<td>warm up + special running drills 1x300m hurdles drills in place and motions - 20 min. 2(3x5H) in 16 steps (25.9-24.7) easy 1x800m</td>
</tr>
<tr>
<td>(PM)</td>
<td>warm up + free striding 3x60m 8x150m at 80%, 250m walk fitness (conditioning) - 30 min.</td>
</tr>
<tr>
<td>F</td>
<td>warm up + special running drills 400m hurdles drills - 20 min. 3x1H, 4x2H, 3x3H, 2x4H in 16 steps (2 feet closer) relaxation drills</td>
</tr>
<tr>
<td>Sat</td>
<td>cross country - 4 miles</td>
</tr>
</tbody>
</table>