
Identifying And Developing Elite Hurdlers In The United States

This article was presented at the XXI Scottish International Coaches Convention, November 30-December 1, 1996, and was reprinted by the British periodical, Athletics Coach, in their Summer 1997 issue. Sparrey has taken the complex training theory as espoused by Bompa and others, and has described a four-year plan in the clearest terms possible. Her discussion of the U.S. model is precise, and right on target.

REPRINTED FROM TRACK COACH #141 (Fall 1997)

THE U.S. MODEL

The United States has continually relied on a “self-selection” system which occurs through mass participation and natural selection. This requires widespread participation across all ages and all levels in track and field. Mass participation in track and field in the US is an apparent problem because of competition with other, more highly organized sports such as football, baseball, basketball, and soccer (Henson, 1993). Many youths currently possess the untapped potential to excel in track and field, but are either unaware or playing another sport. Although there is a need for a more formal method of talent identification, such as with Australia or New Zealand, the U.S. has been able to identify talent and encourage young

athletes to participate in track and field through its present system.

United States of America Track and Field (USATF), the national governing body, offers a system of youth or club support programs to identify and develop talent in track and field. USATF hosts a series of championship meets for age group track and the junior elites. It also hosts junior camps and clinics for educating coaches as well as young athletes. In addition, it provides funding for junior elites to attend camps, summits, and the Junior National Championships.

Young athletes will generally have had some exposure to track and field through track clubs and age group track and field. Most club involvement supplements the high school program and vice versa, since the official high school training and competition season

only lasts three to four months. However, the first exposure to track and field tends to occur at the age of 14, through the high school program.

Collegiate institutions across the U.S. have been the “real” training centers for American track and field athletes. Most, if not all, of our Olympians have been products of the American collegiate structure. There exists several organized university athletic systems: National Collegiate Athletic Association (NCAA), National Association of Intercollegiate Athletics (NAIA), and National Junior College Athletic Association (NJCAA), to name a few. The most widespread is the NCAA with three divisions, with Division I being the largest and most competitive.

Track clubs exist throughout the U.S. However, with NCAA rule limitations, the club system best serves either

*By Kathleen Raske Sparrey, Hurdles/Sprints Coach,
Miami University, Oxford, OH*

youth or post-collegiate athletes. It should be mentioned that most post-collegiate athletes choose to continue training with their college coach on their college campus for many obvious reasons (success, facilities, familiarity, etc.), but the predominant reason is the fact that most often they have nowhere else to go. The USOC has training centers, but these centers perform more of a facility/summit function. Our elite athletes generally will not live at a center because their coach is somewhere else. So, in essence, the U.S. has a multitude of “training centers” across the country and the collegiate institutions are the training grounds for our current and future Olympians.

TALENT IDENTIFICATION

As a recruiting coordinator for an NCAA Division I university program, I have particular criteria which I rely on to identify talent for my program. Specifically, for the female hurdler, the following criteria/information is most important in talent identification.

1. **True performance:**
 - a. hurdles—100H, 300H, 400H
 - b. open sprints—100m, 200m, 400m or 600m (indoor)
 - c. technical efficiency/mechanics
 - d. progression of performances;
2. **Anthropometric factors/body type:**
 - a. height/weight
 - b. body composition (per cent fat)
 - c. lower leg length (soleus)
 - d. joint mobility (hip);
3. **Training age:**
 - a. how many years preparing specifically for the hurdles
 - b. first exposure to track and field;
4. **Sports background:**
 - a. other events in track and field—long jump/triple jump
 - b. other sports played besides track and field;
5. **Previous injury/illness:**

- a. stress fractures
 - b. shin splits;
6. **Personality:**
- a. “heart”/desire/courage
 - b. compatibility with coach
 - c. developed goals.

There is a need to highlight a few items above that have helped me to recognize the athlete’s potential and identify critical factors that affect production of positive hurdling results. The areas that are crucial include: technical/mechanical efficiency and horizontal velocity. Speed development focuses on stride frequency in the 100m hurdles (since the hurdles are a standard 8.5m apart) and a decrease in ground-contact time and air time. Both factors are applicable in the 400m hurdles, with stride length becoming more important for stride pattern establishment.

In addition, several other elements are significant to hurdling talent. First, a gymnastics background is one area where I feel an athlete develops important biomotor abilities for track and field, and specifically hurdling. These athletes tend to be fearless, more coachable, more flexible, more disciplined, have a better kinesthetic feel, have better overall body strength, and lastly, they tend to be better competitors. The athlete with a gymnastics background can master good hurdling skills within 3-4 months (Korchemny, 1996).

Second is the determination of “heart.” I try my best to first create a window and look into the heart to determine if that prospective athlete has the motivation and desire to be the best athlete he/she can be. This is one of the most important factors coaches should identify.

Based on the above criteria, the coach must use his/her best judgement for identifying talent for their program. Note that each institution will be recruiting for their individual program, looking for hurdlers who can produce at the level they are at, with respect to their athletic conference.

Lastly, one must always remember that if you recruit thoroughbreds, you get thoroughbreds. However, this usu-

ally is not the case with most coaches. Most coaches coach, or rely on, the developmental type of athlete, so doing a good job of coaching them is critical to success in any program!

DEVELOPMENT OF ELITE HURDLERS: ASSESSMENT OF THE INDIVIDUAL ATHLETE

How does this relate to the development of the individual hurdler? Once talent is identified, the coach should determine the individual strengths and weakness of each athlete.

The Profile

When the athlete first enters the college program, the coach should build a complete athlete profile. This should include a complete history, current status, and goal setting. I utilize a questionnaire format for the athletes to fill out). Questions asked are directed at attaining the most useful information for the coach to develop his/her individual training program. It should also take a holistic approach, looking not only at physical facts, but also psychological information, with the concept that mind and body must work together, train together, and learn together.

A psychological overview is critical to the coach in both the planning and interaction points of view. Questionable motivations, dysfunctional backgrounds, coaching changes, negative behavior, traumatic experiences, etc., are key components that can sabotage even the best teaching approaches.

Testing

Coaches will be able to determine their athletes’ strengths and weaknesses through a series of testing parameters. Testing also serves to identify talent, motivate athletes, and predict performance. I use the following tests:

1. Anthropometric factors, e.g., height/weight/per cent fat/length of soleus;

2. Isokinetic testing can be useful in identifying imbalances between legs, e.g., Cybex testing to determine hamstring-quadriceps ratios, hamstring-hamstring, quadricep-quadricep, etc.;
3. Aerobic base. 2400m aerobic run will determine aerobic/cardiovascular base and general overall fitness. Mostly used when returning from summer break to determine if they followed training regimen;
4. Speed. 30m fly/30m standing—determines both absolute or top speed and ability to accelerate;
5. Power. Overhead back/between legs forward/vertical jump/standing long jump—all indicate leg power or total body power;
6. Power/co-ordination/speed. Standing triple jump/3-5 bound—both indicate leg power, speed and co-ordination;
7. Max and dynamic strength. 1RM bench press/back squat/power clean.

It has been found that leg power is a primary determinant of track and field performance (Henson, 1993). Thus, leg power tests are useful; however, you must choose testing parameters that you feel are pertinent to your program. The coach must keep accurate records, be consistent with regards to when tests are performed, as well as how tests are administered or testing will be useless to you. You can then compare over time who are the best athletes, predict performance, or assess your training program.

Test Analysis

It is important for the coach to be able to interpret the results. Coaches can utilize test results in different ways. There are many normative, elite, and “sedentary” tables that a coach can use for comparison. One way is to assign scores to each performance and add them together to get a total score, using tables such as *The Hungarian Tables* (i.e., quadrangular test). Here you are able to identify talent and predict performances. With athletes who are already involved in your program,

you can compare the results from one season to the next or from one month to the next to determine the effects of your training program. If athletes are recording a steady progression over time, development is evident and the program is effective. If the athlete is not progressing, then one must identify the problem area and change the programming.

Problems of the Youth Hurdler (Ages 14-17)

The following is a list of common problems in hurdle development that I experience with the high school age athlete:

1. Under-development biomotor abilities/lack of overall fitness. Fitness is the ability of the athlete to function efficiently and effectively in the specific demands of training and performance (Sands, 1995). This includes lack of cardiovascular base, work capacity, flexibility (especially in boys), postural/general strength, local muscular endurance, and coordination. There appears to be little exposure to strength training in these years, as well as rehearsed coordinated movements. Many speculate that this is due to the lack of physical education requirements in the grade school systems.
2. Training age is very young: Training age is the number of years preparing specifically for the hurdles. The exposure to the hurdle events is perhaps occurring too late. This could be due to the absence of hurdle coaching or perhaps because they were not identified and encouraged to participate in the hurdle events early on.
3. Lack of takeoff mechanics and rhythm. Rhythm refers to a three-step pattern performed between hurdles or one’s ability to display running speed and hurdling technique simultaneously. The high school athlete tends to run flat-footed and thus hurdle flat-footed. The athlete cannot stay in “hips tall” position and on the balls of the feet for a long period of time.

The result is poor preparation for takeoff and inability to raise the center of mass and, hence, drive the center of mass through the hurdle. As a result, optimal hurdle rhythm is not obtained.

DEVELOPMENT OF ELITE HURDLERS: PLANNING AND ORGANIZATION OF TRAINING

Four-Year Programming

Refined hurdling skill requires years of training directed toward development of strength, quickness, coordination, flexibility, and rhythm. These are the foundations of performance. The coach must know how to develop the biomotor abilities in the most efficient and effective ways given the age, current fitness levels, talents, and aspirations of the athlete. The coach should have an idea of what level can be attained by the individual athlete in the long term, such as two to four years down the road. If it is probable that an athlete will be involved in your program for more than two years, the development of the hurdler should be viewed as a two- or four-year project. The concept of periodization/planning a training program is essential for progress. It should be 80 per cent thinking and 20 per cent doing, for planning is the key to long-term success!

The following is an overview of a four-year program for the college hurdler.

First Year Objectives (“Adjustment”):

Develop all five biomotor abilities, with emphasis on overall fitness and general/postural strength. Address the weak areas first!

Transition into college life—establishment of productive lifestyle management, and academic success.

Empower athletes with knowledge of the hurdle events; teach them to be

a student of the sport. Here it is 75 per cent teaching from the coach and 25 per cent feedback from the athlete.

Second Year Objectives (“Strength”):

Continued development of five biomotor abilities, with a continued emphasis on overall fitness and strength.

Continue to teach athlete hurdle technique and race modelling; have him/her participate in program development. Here it is 60 per cent coach and 40 per cent athlete.

Skill acquisition—this is where I see the most kinesthetic landmarks or “hot spots” in hurdle development. The sophomore transition is an exciting one for me because I see huge gains during this year!

Focus on strength development in the weight room. Athletes need to truly begin to challenge themselves!

Third Year Objectives (“Speed”):

Progress in developing the biomotor abilities. Athlete’s overall fitness and strength should be well established during this year.

Athlete should be knowledgeable in his event, so much so that he is able to, in essence, “coach himself.” Here it is 50 per cent coach and 50 per cent athlete.

Focus is on speed over the hurdles and development of top speed.

Fourth Year Objectives (“Skill”):

Development in all five biomotor abilities; should reflect the previous three year’s progression.

Athlete’s knowledge level at its highest; can coach himself or others and have an “educated eye.” Here it is 25 per cent coach and 75 per cent athlete, if you’ve done your job.

Top progression—athlete attains highest level of performance possible.

Skill acquisition is the highest.

Focus on getting to that next level by introducing most advanced hurdle drills/methods.

Adhering to the fundamentals of sprint training principles and exercise

selection principles throughout the program, easy to hard and part to whole is absolutely critical. However, skill acquisition must be sequenced through a series of exercises that are simple to complex, easy to hard and part or whole.

Coaches should remember that hurdling is a complex motor skill and involves a fear factor, so “chaining” and “shaping” to modify form/technique should be utilized. For example, the coach should use stages of hurdle drills for skill acquisition such as starting with runs over sticks or pizza boxes placed on the track with a discounted three-step stride pattern that allows the athlete to sprint between “hurdles” to develop rhythm. Then implement a gradual increase of hurdle height and distance at the appropriate times. Another example would be to start hurdles with stationary/in-place hurdle drills, then advance to walking/skipping drills, and finally to running/rhythm drills.

The coach should also be cognizant of “chaining,” which refers to the strategy in which the teachable components (or links) in the chain are reinforced in a specific order, or sequence, to form more complex behavior that ultimately occurs as a single cohesive performance (Sherman, 1995).

In other words, divide hurdle tasks into smaller steps and arrange in sequence for instruction, appropriate for the level of that particular athlete. For example, use side-of-the-hurdle drills to isolate trail or lead leg actions. The coach and athlete should use a detailed task analysis for skill acquisition to discriminate correct or incorrect movements.

It should be noted that sequencing should be used in developing all five biomotor abilities in the annual plan. For example:

Speed: acceleration—top speed—speed endurance

Stamina: extensive tempo—intensive tempo—speed endurance

Strength: general/postural strength—max—power—maintenance

Skill: stationary—marching—running

The athletes who have started hurdling specialization at an older age (14-17), after being in a sport other than track and field, and who are also relatively physically developed and coordinated, can go through an accelerated learning process (Korchemny, 1996). The coach must first address the weak areas of the hurdler. Overall fitness and improvement of biomotor abilities (strength, skill, suppleness, stamina, speed) to build base foundation should be a priority; however, an introduction to hurdling can occur during this stage of development. Modified hurdling with a focus on rhythmic units can be introduced. The junior hurdler should rehearse a variety of hurdling skills using barriers of different heights and distances. For example, she should practice hurdle technique over 24-30 inch barriers and run distances that facilitate fast execution of a three-step rhythm.

Whether the athlete is in high school, college, or post-college, a combination of hurdle drills should be utilized (stationary—marching—running). Hurdle drills are very important to the advancement of mechanical proficiency by improving hip, knee, and ankle joint mobility, along with rhythm specialization. During the base preparation period a higher volume of drills (200-225 hurdle movements per session) are used with more emphasis on stationary and marching drills. During the pre-competitive and competitive periods, marching and running drills are employed (75-125), mostly performed in the warmup.

Lastly, during the competitive period, the focus is on horizontal speed and technical perfection in the running and rhythm hurdle drills. It should be noted that hurdler rhythm endurance needs to get special attention during the competitive period, thus hurdlers need to run over 12-14 hurdles that are discounted throughout.

With regard to running both hurdles, it is my philosophy that a 400 hurdler should also train and compete in the 100H (remember that this cannot work both ways). This will enable long

hurdlers to become much more technically efficient and better train their strengths. During the indoor season, have them run the 200 and the 55H. Always remember that the greatest difference in the 400H is the metabolic challenge!

Guidelines for the Annual Plan

Use of sequencing in your training program should also be applied to mesocycles (Bompa, 1990). This can be referred to as "block training." A block of training generally lasts four to six weeks. Each block should have an attached theme, for example, "work capacity" or "strength" or "speed." Within this block, regeneration and recovery must be planned. For example, gradually increase the workload over a three-week period, then "unload" on the fourth week. Regeneration must receive special attention to avoid overtraining. Almost half of the athlete's success will depend on recovery!

A multilateral approach to training must be employed in the annual plan. Multilateral training simply refers to applying a variety of exercises to the training program. This is the "spice of life" method of training to maintain an overall balance. Failure to balance training will lead to injury, a detraining effect, and an improper peak. A coach cannot over-specialize for a long period of time, and improvement of the biomotor capacities should be viewed as long term. Varying the practices and training environment will produce a greater transfer to competition.

Use of dynamic flexibility and mobility should be emphasized throughout the four-year and annual plan. Coaches should use a steady diet of dynamic flexibility/mobility for the following reasons: prepares joints, aids muscle recruitment, event specificity, wakes up the central nervous system, establishes correct motor pattern, and can act as a catalyst for subsequent explosive actions. I use a dynamic flexibility warmup circuit or the continuous warmup daily throughout the year.

CONCLUSIONS

The development of elite hurdlers requires approximately six to eight years of specialized training and an additional four years of general physical conditioning to reach top performance (Korchemny, 1996). Fifty per cent of the world's best 400m hurdlers are over 27 years old (Stepanov, 1989) and average age of the female world class 100m hurdler is between 24-30 years of age. With this in mind, the U.S. continually looks to the college coach to target this select group of upcoming hurdlers and develop them accordingly. The high school or club coach is responsible for the development during the ages of 14-17.

The idea of periodization in setting up a training program is a must for progress. A good coach will be able to train all athletes together early in their program with the focus on developing all the biomotor capabilities. Once prospective hurdlers are identified, an introduction and encouragement to the hurdle events is necessary. Special attention must be given to developing horizontal velocity, mechanical efficiency, mobility of the hip joint, and hurdle rhythm. Following sound sprint training and exercise selection principles, such as sequencing, is certain to be a critical asset to the training program and hence overall development.

It should be noted that many coaches find it difficult to transfer the planning and organization of training to the actual practice. **The practical application of any training theory relies on the ability of the coach to "unfold the art."** The art of coaching takes into account common sense, intuition, and perceptions.

Transferring theory into practice when planning the training program can be made easy with a training menu system or inventory. This piece of guidance can make a significant impact in any training program. Use of training inventories can better enable the coach to set up and follow the overall flow of an annual plan. Planning is essential to

coaching since there is so much information needed to organize a training program. Inventories will be able to categorize each area, for you to then choose the appropriate exercises.

As with any training program, there is a need to continually assess and monitor. A coach can do this through testing, biomechanical evaluation/film analysis; postural/alignment/joint stability checks; tactical and technical evaluations; specific endurance evaluation; and performances. Coaches should then make adjustments accordingly.

It is advisable for the coach to experiment throughout the year to find the optimal means of eliciting peak performances at the proper time. It is important for the coach to record or write down as much information as possible in addition to the overall periodized plan. A coach should write a justification for each segment of the training plan, important observations at practices or at competitions, how the athletes respond to you, others, and training. Many work with dozens of athletes during a year and this assists the coach in retaining critical information for each individual.

Developing the hurdler physically is just part of the challenge in coaching. Athletes in my program are developed from a holistic standpoint. The concept here is based on development of mind, body and soul together. Encouragement and support to become good citizens, successful students, and quality people is the first and foremost objective that any coach can be proud of.

REFERENCES

- Bompa, T.O. *Theory and Methodology of Training*, Dubuque, IA: Kendall/Hunt, 1990.
- Bompa, T.O. *Power Training for Sport*. Ontario, Canada: Mosaic Press, 1993.
- Freeman, W., et al. Factors Influencing Skill Acquisition. *Track Coach*, Vol. 131, Spring 1995, pp. 4176-4178.
- Henson, P., et al. Predictive Testing for Athletics. *Athletic Science Bulletin*, Vol. 5, No. 2, 3, 4: Feb-July, 1993.
- Korchemny, R. and John Millar. Introduction to Hurdling. *USATF Women's Hurdle Development Newsletter*, Aug. 1996.
- McFarlane, Brent. *The Science of Hurdling*. Ottawa, Canada: Dollco Printing, 1988.
- O'Donnell, K. and Loren Seagrave. Information from Speed Dynamics Elite Seminar; Cleveland,

-
- Ohio 1995.
- Sands, Bill. Physiology—Neuromuscular Principles. *Track Coach*, Vol. 130, Winter 1995, pp. 4151-4155.
- Sherman, Cheyne. Shaping and Chaining Motor Skills. *Track Coach*, Vol. 130, Winter 1995, pp. 4148-4150.
- Stepanov, V. Women's 400m Hurdle Problems. *Track Technique*, Vol. 108, Summer 1989, pp. 3457. USATF Level II Curriculum Materials, Coaching Education Certification, 1996.
- Winckler, Gary. Principles and Resolution Problems in the Hurdle Programme. USATF Level III Seminar, November 1996.