Absolute Speed, Absolutely!

Philosophy, Training, and Technique for The Sprint and Hurdle Coach

Tony Veney

USATF Master Coach & Founder

To My Wife Cloe:

Who didn’t know what marrying a coach was going to be like and she stayed with me anyway!

Be a Coach,
a "REAL" Coach!

Don't be so concerned about coaching the technique that you overlook coaching the kid!

Don't allow yourself to be "handcuffed" by *predictors.*

Know the difference between working out and training (they can do workouts without you).

Your worth as a coach cannot be measured by the volume of vomit on the track!

Know the Race "Critical Zones"

The Elite Athlete Profile

Don’t let the word “elite” put you off. Whether your girl can run 11.85 or 13.00 in the 100 meters, or your boy runs 48.00 or 54.00 in the 400 meters, the attitude of being great and expecting greatness covers everyone.

1. Know the price of success and remain prepared to pay a little more each year (success has an inflated price tag every year).
2. Greatness requires you to accept being personally inconvenienced.
3. Liberate yourself from peers that don’t share your vision: satisfaction with mediocrity is deadly.
4. Be prepared to step outside the norm to do something and be someone special.
5. You are special – people like you do what only 5% of the planet can do.
6. Lead the way to a superior performance. Never be satisfied.
7. What does not Kill You……. KILLS THEM!
8. Don’t hang on someone else’s expectations.
9. Be able to turn your back on those who don’t share your vision, or do not want to pay the same price you’re willing to invest.
10. Fight like Grim Death!
11. If you’re going to be a leader, then you must turn your back on the crowd: it exposes your back to criticism and ridicule from the chasers but puts you one step closer to the finish line.
12. They only give three medals: Yours and what’s left.
13. What’s down in the Well, comes up in the Pail. What are you deep inside?
14. If it ain’t broke……Break it to bits.

Purpose Statement

The intent of this manual is to provide the coach with a thumbnail sketch of how to prepare their sprinters and hurdlers for the coming season. There are tons of books, journals, videos (I, myself have published some of those), and periodicals available. This manual will not come close to covering every aspect associated with sprint and hurdle training and development. What I hope to do is trim some of the fat and make sprint-hurdle coaching more manageable.

Putting together a puzzle is a complex endeavor, made complicated if you don't know what the finished product is supposed to look like (that's why the box displays a picture of what your puzzle will finally look like). But like a puzzle without a picture to guide you, coaching without a specific plan puts your athletes' success in peril. This manual will serve as your "box", guiding you from the start of the season to its championship conclusion. As you know, as a puzzle begins to take shape, a picture of the final product becomes clearer making the remaining pieces easier to place. The puzzle of the sprints and hurdles will get easier as you move closer to the end of the season if you have a good idea of what you want your boy or girl to look like from the beginning. You should not find yourself pulling your hair out in May or June trying to figure out "what to do next."

Without a foundation of sprint and hurdle familiarity, you'll be reduced to hit or miss training, or just following the cookbook approach from an elite coach. This manual will provide you with a blueprint, or road map for sprint and hurdle success. My hope is this manual will serve as the GPS for your upcoming track season. And when you reach the end of the season, there won't be any pieces left over or pieces being jammed into a spot just because it looked good there.

Good Hunting!

Part One

Basic Hurdle Philosophy

"To Begin, ***Begin***"

Sprinting vs Hurdling

Sprinting

=

Maximal Stride Length

X

Maximal Stride Frequency

Establish the ***fastest*** frequency and ***longest*** stride length ***possible***

Hurdling

=

Optimal Stride Length

X

Optimal Stride Frequency

Establish the most ***favorable*** length and frequency you can run between the hurdles

Coaching the Short/Long Hurdler

Basic Training Elements of the Short/Long Hurdles

Speed: Regardless of the hurdle distance (100mH, 110mHH, 300mLH, 300mIH, 400mLH, or 400mIH), the base line for success is speed. Speed is a skill, so for the life of me why do we insist on making slow, aerobic training part of speed development for the hurdler (aerobic training has a place in the hurdler's preparation, but cannot represent the hurdler's **BASE**)? How can less than skillful activities produce skillful intent? Short answer: IT CAN'T! Were you to tell your cross-country coach to train his distance group with weekly, or even daily fly 30m reps or block starts, that coach would tell you to "pound sand!" So why do we allow slow movements to become the baseline for success in events that require velocities above and beyond what aerobic training can produce? We do it for several reasons:

1. Aerobic training is safe because it's slow and the threat of injury is very low.
2. You can train large groups of hurdlers at the same time (regardless of skill level) which makes group management easier.
3. It doesn't require any imagination or work on the part of the hurdle coach.
4. We think the aerobic work makes them "strong."
5. A lack of understanding concerning the real meaning of speed development. Many young and older coaches feel running fast is the only way to get faster. But any activity that fosters an increase in strength, power, and technique can make you faster (fly runs, towing, running with or against the wind, hills, stairs, sand, sleds/tires, plyos, weight room, flexibility & mobility).

Rhythm: For the hurdler, rhythm training is the primary concern for the hurdle coach, and must be protected at all cost from other training influences (this includes non-hurdle running). Short Rhythm work is the "Holy Grail" for the 100m and 110m hurdlers. This type of training must be incorporated into your hurdle sessions using frequency and quickness drills/runs. Since the distance between the hurdles is a set value, the hurdle coach must realize the average three step stride can be as much as 25% shorter than your hurdler's normal "step-over" sprint stride. This requires you to be mindful of the stride length issues associated with "shuffle technique" or "between the hurdle running mechanics." The shuffle or low heel recovery between the sticks is more prevalent among men since the distance between the hurdles jams up the men more in relation to male leg length and max stride length than for women. This does not mean female hurdlers should

not develop a rhythmic unit running technique between the hurdles. The low heel recovery run is often upset by the higher heel step over mechanics of flat sprint training.

This knowledge should cause the hurdle coach to be mindful of the amount of flat/non-hurdle running your young people must do every week. Hurdlers are also pulled away from their technique when they are asked to run on the relays (or the jumps). This problem can be minimized by placing your hurdlers on the turn legs of the relay which can more easily simulate a quicker running cadence. A bigger step over stride will eat up the 8.5m/9.14m hurdle distance forcing your hurdler to make radical on the fly changes in their hurdle take-off, clearance, touchdown, and between the hurdle run (like taking off to close, a high clearance, or crashing into the hurdle with either the lead or the trail leg – either way you bleed). Flat running also has a negative influence on the approach to the first hurdle, where maintaining a rhythmic approach over the first eight (8) steps to hurdle #1 is of principal concern (even though some top-flight men run seven (7) to hurdle #1). Let's look at how important rhythm is:

Hurdlers	Harry-Hit-a-Hurdle	Becky-Bang-a-Barrier
Avg. Stride Length	2.40m	2.25m
Hurdle Spacing	9.14m	8.50m
Take-off Distance	2.10m	2.00m
Touchdown Distance	1.40m	1.10m
Hurdle Stride	3.50m	3.10m
Hurdle Running Distance	5.64m	5.40m
Average Hurdle Stride	1.88m	1.80m

From this illustration, the set hurdle distance forces Harry and Becky to run between the hurdles using a stride length that is 22% and 20% shorter than what they would normally use. With this knowledge in hand, the hurdle coach should be able to teach the proper rhythm between the hurdles. This includes staying clear of four step patterns for the short hurdle race unless it's for developing a drill that allows the hurdler to become comfortable using a long hurdle rhythm. If your hurdler cannot run three steps

between the sticks, they lack the speed for the event or there is a significant fear factor that must be overcome (or blame the gene pool). The hurdle rhythm allows your boy or girl to sustain a set/ingrained stride pattern, so they can weather increasing race stress as the running speeds increase from the start up to the 5th and even 6th hurdle for boys and 4th to 5th for the girls.

If you cannot stabilize the stride length, the increasing race velocities will run your kids too close to the hurdles causing poor set-up and clearance mechanics. **Indoor Coaches Beware:** The indoor season can fool you since your hurdler is right on the verge of hitting big hurdle speeds. By the time your 55m or 60m hurdler is ready to hit top hurdle speed, they are preparing to hit the finish. The indoor season does a great job of establishing the early-race hurdle acceleration, but you must start to incorporate some longer reps as you move closer to the outdoor season.

Make sure on the days you are doing short rhythm work, **that is all you do.** This is quality work, and if you do it right with the correct number of sets, reps, and recoveries, they will not need to run 2x200's, 1x350, or 1x500 to finish off the day just because you feel they haven't done enough "work" (let their bodies learn what you were trying to accomplish for the day). If you're afraid the intensity and the volume of work is not enough, "work'em out" at the meet with combinations of races and jumps (it's the best speed endurance and technical day they can get) if your coaching "Blood Lust" must be satisfied.

Before moving on to the next topic, I wanted to make another race comparison. Earlier you saw difference between Harry-hit-a-hurdle and Becky-bang-a-barrier's personal race requirements. I wanted to show how similar average and elite hurdlers are in the shorter races.

Hurdlers	Allan Johnson (12.91)	Harry-Hit-A-Hurdle (15.55)
Steps to H1	8	8
Steps Between	3	3
Hurdle Clearances	10	10

Steps to the finish	5	5
Total Steps	50	50

Hurdlers	Dawn Harper (12.41)	Becky Bang-A-Barrier (14.99)
Steps to H1	8	8
Steps Between	3	3
Hurdle Clearances	10	10
Steps to the finish	5	5
Total Steps	50	50

In both instances when comparing the elite and less than elite hurdler, the number of total steps run are identical (a stride less with the men when you have a man running only 7 steps to hurdle #1). With the race restricted to a set distance to, between and after the hurdles, stride frequency becomes the quality all hurdlers must master. More mature hurdlers can resist the urge to open their strides and reach for the next hurdle as central nervous system fatigue attempts to slow them down. Unfortunately, the less than elite hurdler falls into the quicksand and as they begin to slow down, they immediately open their stride believing this technical change will stop the deceleration. On the contrary, the opening of the stride while getting tired causes the hurdler to cast the lower leg in front of their hips resulting in the hurdler slowing down even more.

The hurdler doesn't believe this is the root of the problem, so they open bigger and bigger, unaware this is the very thing slowing them down. The hurdler then begins to doubt whether they are fast enough to run this race. But imagine while driving your car, you pull on the parking brake every time you accelerate. Over time, you'll think your car isn't very fast. But you're doing it to yourself. As sprint hurdle coaches, we must stop them from doing it to themselves.

There are five (6) areas of hurdle development every sprint hurdle coach needs to address as they plan and implement their training goals for the year:

1. Speed Development (Acceleration/Max Velocity Work)

2. Rhythm Endurance (Hurdle Endurance & flat Speed Endurance)
3. Specific Strength (For Hurdle Take-off, and Touchdowns)
4. General Hurdle Model (What does 14.00 look like?)
5. Major/Minor Weekly Themes (Macro Plan fort he Year)
6. Short or Long Specialist (What are you?) A Hybrid?

Speed Development is the "Base" for the short and long hurdle events, requiring running distances at high velocities for no longer than 6 to 7 seconds. This does not mean the Speed Development base is established at the expense of aerobic conditioning. It means "S.D." is addressed first. "You must develop the speed you need before you can run at a % of that speed." However, were you to start your training phases using an endurance approach, aerobic speeds would prove too slow to assist in the development of maximum velocities. But by starting your training phases with a base of top end speed, your endurance is positively impacted (and the converse is not true). In addition, S.D. also aids in the creation of speed endurance, and lactate tolerances necessary for enabling the hurdler to run numerous events in a competition. The contribution of aerobic conditioning serves its purpose by increasing the size of the capillary beds in your muscles, aiding in the recovery after hard workouts, running rounds, and running back to back days.

Rhythm Endurance workouts comprise reps at practice covering short distance reps with very little recovery (especially if you lack the space due to inclement weather, or inadequate facilities), or reps that take your hurdler out to 12 or more clearances. Remember, the purpose of short rhythm or rhythm endurance runs are to get your hurdler to run where they live (in acceleration or over the last 4-5 clearances). Running hurdles that are lower and closer by 10-20% forces your hurdler to perform movements that closely mimic the speed and technical competency you want them to display during the race. This can seldom be accomplished when you run at regular height and spacing. Your hurdle must get amped up to give you one full run over the sticks at the meet, and then you want them to run repeatedly over regular height and spacing at practice without the benefit of adrenaline, and many times having to run the reps alone. So after running regular height and spacing a couple times, they are gassed and continuing the workout merely engrains poor technical modeling. But running low and close is less exhausting

and more closely mimics how you want them to "feel" (even when they're tired) and how to manage the "feeling." On meet day, the objections for running lower and closer at practice will be addressed by the fact the hurdler now has someone to run against and the level of excitement and anticipation will take care of the height and distance reduction at practice. I am not advocating never running at regular height and distance at practice, but if you want to change your hurdler to someone that can run a new PR, you must make them feel the difference between where they are now and where you want them to be. Final point on the low and close debate: jumpers jump from short approaches and off ramps, while throwers practice with lighter implements in an effort of improve their technique. Give your hurdlers the same advantage.

Back to rhythm endurance hurdle running. When running out to 12 (or more) hurdles, you're trying to teach race management in a state of fatigue while still being able to perform proper hurdle mechanics. You can run 12 hurdles and reduce the running distance 3-5 inches per hurdle to keep the hurdles flying at you and forcing the hurdler to run at a high level of technical competency over the last 4 hurdles. This kind of endurance hurdling will keep the hurdler from starting to bound and opening their stride. A good rhythm endurance workout could be:

- 2-4x12 hurdles (gun started) low and close with 10-15 minutes recovery.
- 2-4x12 hurdles with hurdles 1-5-9 at 20" and the rest at 30" – the first hurdle sends your hurdler flying to the second hurdle with a big boost, and a lower 5th and 9th hurdle gives you another boost so they can feel the continuance of race speed and technical quality.
- 5 hurdles at 30"/8.20m apart from a 3 point start – after the 5th hurdle you run to the finish line (practice you finish and dip), and after one minute, you repeat the flight running in the opposite direction with the hurdles at 30" and closer at 8.0m apart – take 10-15 minutes recovery run the set 2-4 times depending on what time of year it is, or whether or not you have a meet that week. Don't worry about the recoveries being so long, since they get 3-4x's the rest at a real track meet between the races. The above examples can be adjusted for the men's race.

Specific Strength for your hurdler is another critical area for their overall technical development. Drills outside the weight room (remember young children can acquire increased strength and power away from the weight room by performing drills

that use their own body weight as the stimulus) that teach proper movements and copy the general hurdle model are important for every practice. Plyos, skipping, hopping, stairs, hills, rope jumping, medicine ball throws, dragging tires, sand running, hip flexions and hip extension are examples of the things you can do that improve the springy and elastic muscular interplay for a sprint hurdler. The development of specific strength also helps to improve hurdle coordination, explosive power, core stability, and has a significant influence on starting strength. Since young women lack the same strength and power levels young boys possess (especially after puberty), the development and maintenance of strength is critical.

When you begin to plan what you want your hurdler to look like, Start out with a **General Hurdle Model**. This will enable your hurdler to start with a basic blueprint of what hurdling requires, while allowing them to gradually progress to the hurdler their unique abilities will lead them to. Trying to cram your hurdler into an Allan Johnson, Aires Merritt, Gail Devers, or LoLo Jones mold will only serve to frustrate you and your hurdler as you try mimic skills only that hurdler can do. The bottom line becomes not what they look like, but how are they able to negotiate 10 hurdle clearances in the least amount of time. Find out what they do well and attack those qualities rather than just trying to copy the visual qualities of the elite hurdler. When you observe 4 or 5 elite hurdlers who can run 13.00 for women, or 13.25 for men, determine what do they all have in common. There are certain starting, airtime, ground time, shuffle mechanics, and steering mechanisms that each of these hurdlers possess. Once you figure out what that looks like, then you can begin to construct a hurdle model that suits what your hurdler brings to the table. Also, former male hurdlers who coach girls and women should learn all they can about the sprinting through a 33” hurdle and avoid using technical compassions and cues they learned or believe regarding the 39” and 42” sticks.

Since the 100m hurdles is not the same event as the men’s 110’s, former male hurdlers who now coach the women’s sticks must be aware of the different take-off and touchdown mechanics. It’s sad seeing a 5’8” female hurdler lowering her head and dipping into each hurdle because that’s how her hurdle coach was taught or believes will get her through the race faster. Most women can straddle the barrier, which means a flatter take-off is possible allowing you to run through the hurdle rather than requiring the woman to go up, over and down off the hurdle as in the men’s race.

Have a Major and Minor Weekly Training Theme, much like a teacher's lesson plan keeping the sprint hurdle coach on point and goal oriented and can also prevent over-training. Remember, if you have at least one meet per week, you must find time to rest besides Sunday, or resting due to an ***"INJURY."*** Decide if your week is going to concentrate on rhythm endurance, or if the main theme of your week is the first 3-4 hurdles (acceleration patterns). Is this a speed and power week, with a minor emphasis on endurance, or is it a tempo recovery week with drills and technical concentration, or is it a bye week training through being the bulk of your training plan? Hard hurdle workouts need some form of tempo recovery (technical) day(s) depending on the number of meets for the week or if your kid is so good they can train through (be careful here not to overdo it merely because your kid is better than the competition they will face in the meet(s). Knowing what to do before you do it allows you to have a "Plan B" in your back pocket should someone crash a hurdle, get sick, or someone must unexpectedly leave the track due to a family emergency. Flexibility keeps you from being a slave to the blueprint and lets you decide what needs to be done, rather than panicking because the plan says, "hit it hard" and your kid comes out to the track with a sore hammy, or it rains/snows three inches, or they're just too tired to go that day..

Decide if your hurdler is a **Short or Long Hurdle Specialist.** Every now and then, you find a kid who can run both races equally well, but most are either a short kid who can run the long hurdles or a long hurdler who runs the short races well enough to score points. But regardless of which your kid is, speed development is important to both race distances. However, the short hurdle event requires more time and different training demands than those of the long race (especially the 400m distance). To be effective in the hurdles or any event, you must train with specific attention to the ***time frame*** needed for success. Following the laws of specificity, running 3-4 starts over five short hurdles, and then follow this workout with 4 runs over the last 4 hurdles of the 300m event. Regardless of their event concentration, plan your weeks to address their strengths to allow the highest quality of learning to occur for both events. You can also use the meets running the 4x100, 100H, long jump and 200m for the short hurdlers, or 4x100, 400, 300H, and 4x400 for the long hurdler day. Running both hurdles makes for a good training day sandwiched between both relays or a jumping event.

Part Two

Meat and Potatoes Hurdling

"Hard Work Beats Talent When Talent Won't Work Hard"

The long and short hurdles are two events that have been traditionally seen as the backbone of many track and field programs. The short hurdler can run the 100mLH/110mHH, the 4x100, the 100m, 200m; with takeoff mechanics, like those used in the jumps making them a potential HJ/LJ/TJ prospect. Some hurdlers have also been very good decathletes and heptathletes. The long hurdle event in high school (300-400 intermediates) still provides a speed base so the hurdler can contribute to both the 4x100 and 4x400 relays. And in some cases, the long hurdler can run legs on the sprint medley,

4x200, distance medley, and even provide a 4x800 split. The 300-meter hurdle event thus becomes the "tweener" event because 300 meters does not reach the debt ratio often experienced in the 400 meters (unless you live in a state where the 400 hurdles is your distance). Since lactate becomes dominant after 40 seconds, good 300 hurdle boys (37-39) sec.) don't have to deal with the same issues of lactate tolerance girls will face (or slower boys). The training of the 400 hurdler means having to incorporate more 400-600-800-meter type training into their development without overlooking or ignoring their speed development. The racing rhythms between the long and short races becomes problematic for the coach as your athletes get older and faster. At the high school, Junior Olympic, AAU, Junior National, World Youth level, and even collegiate levels, you can find both men and women who can excel at both the short and long hurdles.

Why can't you find a man or woman who can run equally as well in both events at the USA National or world levels? It shows you how different the two rhythms are when it comes to elite level hurdling. That does not mean you should not run your hurdler in both events. It means we must take seriously the training of rhythms requiring 3 steps and often times 15-17 step rhythms. In high school and college, the dual hurdler can face a myriad of problems in their attempts to secure a stable hurdle rhythm. But when you are trying to win a league, regional, district, or state meet, you sometimes must decide what is in the best interest of the athlete and the program. I have heard coaches speak of their successes with athletes some of you will never get a chance to coach; you know, FREAKS! Don't get me wrong, there is nothing wrong with going to clinics and listening to some of this country's brightest coaching minds. But it's more important to learn the principles of "why" they do what they do rather than just the workout itself. Can the athlete perform a great hurdle workout because the training is really built to lift them to new levels, or are they doing it because they "Can?"

How can the principles of an elite hurdle training approach be applied to the development level of the athletes you currently coach? Even if you have an extraordinary hurdle talent, you must avoid the systematic methodology of doing the same thing every year because that is what worked the year you had that hurdle beast. This is the reason why the first 20 pages of this manual have been devoted to talking this out and not focusing on the workouts itself. Hearing what a world class hurdler does at practice can be awe-inspiring but leaves little room for improving your 15.00 boy or girl unless the elite hurdle is doing things all hurdlers must do to be successful. Understanding what the elite hurdle coach "knows", rather than "what they do" can be a far more valuable

coaching asset when the real "meal ticket" hurdler walks on campus. Be voracious readers and ask tons of questions to better equip yourselves to be great sprint/hurdle coaches. What I do may not entirely work for your school, time commitment and circumstances. But you may be able to glean a little bit here, and a little from another source to build the framework for your hurdle philosophy. I have a friend in North Carolina, who took one of my favorite frequency drills and modified it into a training modality that is spitting out nice hurdle prospects every year for his program (now that's coaching).

Now let's look at the technical considerations for both races to determine the major and minor themes that will dominate your hurdler's development. By having a theme to your week or weeks, it will enable you to decide what to do in a more organized fashion and will keep your young people from over training. Having a theme-based approach to training can greatly reduce your kids getting hurt or injured (know the difference between "hurting" and being "injured"). Each theme should build on the next (like stacking blocks) and the accumulative effect can be seen in your daily, weekly, monthly and seasonal training logs and in your sprint hurdler's legs. An example of a speed/power thematic week would look something like this.

Monday

Warm up – barefoot 2 laps with skips and hops 50m on and 100m jog

Dynamic drills

Acceleration Development: Key Performance Indicator (Dan Pfaff)**

3x10m, bunny hop starts, roll over starts, push up starts

4-5x 10m, 20m, 30m starts (over hurdles after 10m)

Multi-jump 2-3x20m ea. Drill

Weight room – explosive lifts – cleans-squats-lunges-step-ups

Cool down – 800m - dynamic drills

Let's look at acceleration to the first hurdle in the 100/110-meter hurdles. As a sprint hurdle coach, try not to over think or "out-think" yourself. So, remember, no "Hurdler Clones", or creating elite hurdle duplicates from the people you see at competitions or on TV. Build your hurdler's model technique around a generalized model as a starting point and allow your kid to grow into running the race fast. ***No 9 step hurdlers!*** These kids are too slow to run the sprint hurdles, so either wait for them to develop the speed and technique to run the short race or move them into the 300-meter hurdles. Now, if a kid

has their heart set on being a hurdler, don't crush their dreams. Just know that 9 steps to the first hurdle usually means that kid is also a "4 stepper." A 4-step hurdler will manage the event early in the season, but after the coach does a great job getting the kid stronger, faster, and more technically sound, 4-steps won't work. Now, they have ingrained a hurdle stereotype of 4-steps, but their end of season abilities screams 3-steps. The 4-stepper must cut their steps even shorter, or they start over striding to make 3-steps happen.

Earlier I mentioned "No Hurdle Clones" because the trend seems to be making your hurdler (primarily your boys) take 7 steps to the first hurdle. Young men, and on occasion, some young women can complete 7 steps to the first hurdle. But are they jumping to put in the steps? Just because you can get there in 7 doesn't mean you're doing it well, or fast enough to justify the change. No young hurdler should entertain a 7-step approach to the first hurdle unless they have the strength and power levels to keep them from just bounding to hurdle one. So, a combination of 7 steps and a fast touchdown are the parameters needed to make sure the change is a good one. Below are step patterns for a 7 and 8-step approach listed metrically.

On your acceleration day, make sure to place a row of soccer disks, or tape 2.0 to 2.20 meters away from each hurdle. In addition, tape marks on the track can be placed to give your hurdler a set pattern covering the first 7-8 steps to hurdle #1,

	Men's 8-step	**Women's 8-step**	**Men's 7-step**	**Women's 7-step**
1-	0.62	0.60	0.81	0.66
2-	1.80-1.18	1.73-1.13	2.17-1.36	2.07-1.41
3-	3.20-1.40	3.07-1.34	3.79-1.62	3.61-1.34
4-	4.72-1.52	4.53-1.46	5.56-1.77	`5.28-1.67

5-	6.35-1.63	6.09-1.56	7.47-191	7.12-1.84
6-	8.06-1.71	7.73-1.64	9.55-2.08	9.13-2.01
7-	9.82-176	9.42-1.69	11.53-1.98	11.03-1.90
8-	11.52-170	11.04-1.60		

You can see from these step lengths, a high school boy or girl would need to possess "elite" or near elite power, speed and elastic strength to negotiate a 7-step approach. Don't try to force a kid into a 7-step approach just because they are tall, or can make the steps.

Tuesday

Warm up

Hurdle mobility 3-5 exercises x 5-6 hurdles

General strength exercises

Weakness work (technical)

Cool down

Wednesday

Strength endurance – 9x90m hills with 3 mins recovery (add one hill for 9 weeks)

Weights – 80-90% efforts with recoveries compatible to the day's efforts

Cool down

Thursday

Repeat Tuesday – with adjustments based on needs revealed from Monday and Wednesday.

Friday

Repeat Monday – addressing strengths from Monday – only address weaknesses that can inhibit strengths

Saturday

Warm up

Special Endurance runs

a. 2x2x250
b. 2x3x200
c. 2x4x150 – all with 3 to 4 mins recovery between the reps and sets

Hurdle mobility – 2x10 hurdles – 1-6 hurdle exercises

I used this as an example of a themed week ("Acceleration") where the goals for the week are clearly defined. But to make sure you are on point with your training, follow this simple rule of thumb:

"Do everything you "need" to do at practice, and avoid what's "nice" to do"

Your plan for the week should address what they need rather than what you like to do at practice or what seemed to work on this date last year. I have favorite workouts just like the next coach, and we must resist doing "workouts" and really "train" the young people we associate with.

The 100 meter and 110-meter hurdles must be thought of as sprint events, so don't used failed sprinters as your "sprint" hurdle crew. In the sense that acceleration as well as maintenance of high velocity throughout the race are key elements to the best performances, specificity of training is essential. Extensive analysis of topflight hurdling has revealed:

- Acceleration does not end at the first hurdle, but rather continues through the 4th and 5th hurdles (38 to 45 meters). This should not be surprising since acceleration in the flat 100 meters tops out around 30 to 50 meters.
- Stabilization of maximum velocity is extremely high through hurdles 6,7,8, and sometimes 9, Speed endurance, or more specifically, rhythm endurance is well developed by successful hurdlers.
- Attack the first 3-4 strides out of the blocks with the same feel and aggression you would execute in the acceleration from the blocks of the flat 100 meters (driving powerfully from the blocks with a big arm split and aggressive knee punch).
- Complete the last 3-4 steps before the first hurdle with a slightly more upright posture to more aggressively attack the hurdle. This is a more effective position for a hurdle clearance. Strides 6-8 should emphasize an increase in the sprint cadence

which is very much like the frequency seen between the hurdles (or very much like the final steps in the long jump)

- The “attack or cut step” will be referred to as the trail leg foot. It will be the foot that will propel you into the hurdle. The term “attack/cut step” will serve as a better cue than “take-off step”, because the later conjures in the mind a more vertical impulse from the ground. This stride is slightly shorter than the stride before it and requires a less aggressive, lighter, but active landing of the trail (attack) foot. This movement will keep the center of mass over the foot and will prevent any braking caused by the foot being thrown in front of the body. This is a problem with many young hurdlers who are afraid of the speed of the hurdles flying at them. Young hurdlers like to feel “comfortable” and like to feel they can “set up” the cut step. This set up feels comfortable but slows the hurdle clearance but is less scary. Unfortunately, the “set up step” changes the angle of departure from the ground launching the hurdler upward and makes them float the hurdler with a violent landing on touchdown. The active attack step will result in an active/faster landing. An active landing before the attack/cut step will put the trail step into a powerful position. This attack step must be on the spike plate with a slight heel touch within inches of the center of mass. But this will make your hurdler move faster to the hurdle and it scary, and they’ll say the hurdles are coming at them “too fast.” But “too fast” is first place. When you “set up” the take-off going into the hurdle, this is what happens:

a. You decelerate going into the hurdle.

b. You must project upward over the hurdle, causing you to float the hurdle.

c. Now you must wait for the ground to come to you killing any attempts to aggressively run into the touchdown.

d. The floating touchdown is slow and passive, decelerating the three steps between the hurdle.

e. The hurdles begin to feel further and further away, causing the hurdle to begin reaching to cover distance resulting in a worse take-off.

f. The hurdler breaks from their race rhythm and switches to a four or five step pattern.

g. All of these things happen on just one hurdle and you wonder why you're your hurdler feels they are not fast enough when all of these issues pop up ten times.

6. The lead leg action follows an aggressive attack step and the hurdler must allow the cut step and take-off extension to naturally occur. There is a tendency for hurdlers (young and experienced alike) to want to hurry the cut step and jump over the hurdle instead of staying on the attack step as long as possible as the lead knee is driven up toward the hurdle (sometimes to a height above the hurdle board itself) with an aggressive knee drive with the lead foot held back and under the hamstring. The lower leg stays tucked under the lead leg thigh as the lead thigh reaches ground parallel. The length of the lead knee drive helps to facilitate the aggressive split of the lead and trail legs. Once the lead knee reaches its height the lower leg extends through the knee joint, and the height of the knee prevents the lead leg from going completely straight or locking. It should not be considered a technical error if the lead leg does not straighten. By keeping the lead knee high at hurdle attack, the hamstring is initiated and prevents the leg from straightening because of the big stretch already put on it by the high knee position. If the lead knee is blocked (or stopped) early in the take off and low, the lower leg will accelerate forward (casting out). From this movement, the height of the lead foot is too low to clear the hurdle and forces the hurdler store momentum resulting in the hurdler having to throw or swing the entire lead leg upward. But the hurdler will not be able to attack the ground while they wait for the lead leg to move toward the ground. Another problem coming from a poor lead attack reduces the force of the take-off and this slows the stretch reaction of the trail leg. As the hurdler waits for the lead leg to move toward the ground, the trail leg is slowing down as well. This makes the hurdler look as if they are pausing over the hurdle. This poor take-off and touchdown cause the hurdler to leave the ground closer to the hurdle at take-off landing further away from the hurdle on touchdown. Landing too far away from the hurdle at touchdown reduces the effective running distance between the sticks (causing the hurdler to run up on the next hurdle and the floating sequence begins again). This also causes numerous hurdle hits disrupting the sprint hurdle rhythm. Whereas the bent lead leg action has the lead leg already prepped for the ground (and the hurdler runs into the ground rather than floating the hurdle waiting for the ground to come up and meet you). As soon as the lead foot passes the top of the hurdle, with a bent lead leg, the lead leg starts to press downward to the track

and helps to initiate a high follow through of the trail leg (moving into a continuance of the sprint action).

7. The lead arm and the opposing leg must move in a parallel fashion to remain in alignment. If the lead arm is directed inward, the opposing leg will compensate for that move to keep the body balanced. This causes a lot of over rotating of the torso and causes the lead arm to swing out and around the body's center of mass. This disturb the straight-line movement of the sprint between hurdles while the body uses one or more of the three running strides to correct the body's loss of balance. As soon as the lead hand comes into the hurdler's view, it should be run back toward the hurdler's hip pocket with the arm bent in a 90-degree angle. This short angle will hit the stretch in the shoulder hard and snap the arm forward like how the arms will pump in a regular sprint stride. This movement also prevents the lead arm from floating, slowing down the lead trail action. The floating over the hurdle delays action into the ground off the hurdle and causes the ground to come up at you rather than the hurdler attacking downward into the ground. Keeping the lead hand moving back toward the shin of the trail leg prevents the arm from sweeping away from the body.

8. The trail leg works in concert the lead arm actions. The trail leg should be active throughout the range of motion (do not let it pause at any time once it leaves the ground after the cut step). Any hesitation will again, float the trail and allow it to slide off the barrier losing valuable time and effective touchdown position. As the attack foot leaves the ground, the attack foot is driven forward and upward, tucking the heel close to the butt and shortening the trail leg lever as much as possible (this allows the trail foot to pass over the hurdle with greater speed). This tucking of the trail foot to butt forces the trail knee to move upward (staying over the trail foot) preventing the "foot higher than the knee" clearance hurdle flaw. This "flipping up" of the trail foot higher than the trail knee can cause serious hip and knee problems for the hurdler. The trail is kept tightly folded until it has reached a position in front of the body, "knee navel high." At this juncture, every effort is made to attack the ground with the lower leg of the trail as close to the center of mass as possible. Make sure that young women sweep the lead hand in a "karate chop-like" movement going forward (navel high) and then backward along the trail shinbone. The navel high lead hand helps quicken the lead forward and back action. Young male hurdlers have a higher barrier requiring more of a "shoulder

high" lead approach which allows more time to move up, over and down off the 39" to 42" barrier.

9. To prepare for each oncoming barrier, the hurdler must be able to adapt to performing hurdle actions at increasing race velocities. The hurdler must be able to anticipate the hurdle coming at them more quickly than normal, thereby readying themselves for the next clearance. Training at practice should attempt to create a new hurdle rhythm. Where some young hurdlers err is trying to run to the next hurdle. Thinking they are running the actual hurdle distance (8.50m for women and 9.14m for men) between the hurdles, young hurdlers use bounding/reaching steps that cause a rapid loss of race velocity and result in more reaching/bounding as they fight to overcome their loss of speed. Rather than trying to run to the next hurdle, instruct the hurdler to "run away" from the hurdle they just cleared. They allow a focus on race velocity maintenance and while trying to get away from the hurdle, the next hurdle flies toward you. The distance the hurdler runs is approximately three meters less than the actual barrier distance. Since this running distance cuts the hurdler's actual "sprint stride", a premium should be placed on hurdle frequency between the barriers. Call it a shuffle, or a "tight skirt" (Tony Wells), but the measured stride pattern between the hurdles will end up being ***step-over, big step-over, cut-step.*** Since the step pattern between the hurdles is not as uniform as in a regular stride model, it's important for all hurdlers to have frequency training as a staple.

10. The hurdle run-in is another area that must be trained and ingrained. Far too many hurdle workouts fail to incorporate any type of finish practice. Most hurdlers will take 5-6 steps to the finish off the last barrier in the sprint and 300-meter events. In the 400-meter hurdles, 19 to 24 steps are taken to the finish line. Finish practice is critical because coming off the last hurdle is an area of the race where the velocity of the hurdler increases, and the hurdler changes from their shuffle/tight skirt mechanic to flat sprint step over movements. On the next to last step to the finish

line, the arms are thrown back, palms up, pushing the chest through the finish. ***PRACTICE YOUR FINISHES!***

Part Three

Training the Energy Systems

“You Can’t ***Pound*** the Dough If You Want ***Fluffy*** Rolls”

Every human body has a fuel tank with available energy that can be called on during physical effort. This energy supply will manifest itself depending on the time and intensity of the physical exertion. These structures are time sensitive. Even though the systems are simultaneously active once the running starts, their contribution is based on the power output for the time needed. Training the energy systems is like the preparation needed in selecting the right car for the right racecourse.

You wouldn’t drive a formula One race car on a Los Angeles Freeway at 5 O’clock on a Friday. Likewise, you wouldn’t put a dune buggy in the Indy 500. Neither vehicle is

suited for the demands of the drive they've been placed into. So why would you have your 100mH/110mHH hurdler run a series of 600-800-meter runs, send them on a 3-4-mile run, or better yet have them run on the cross-country team? I understand you may need a fifth runner for cross country, and if you must do it, so be it. But don't have your short or long hurdler running cross country because you want them to do ***something*** during the off-season period. The body will adapt to whatever you give it, and if the work you give it is 3 miles in 20 minutes (4.2 meters per second), how can you assume it will translate to 7.14 or 7.86 meters per second (the velocity of a 14.00 100m and 14.00 110m hurdle run)? Would we ask distance runners to use speed and fly runs as the base while preparing for the cross-country season? Distance coaches would tell you to pound sand. So why do sprint-hurdle coaches just roll over and let distance philosophy step on your necks and dictate what a sprinter's base is? Now, aerobic training is an important part of a sprinter's overall development, and I am not advocating an elimination of aerobic training for hurdlers. But as a coach it's important for us to know where each component of your sprinter's training is supposed to go. Aerobic training for sprint-hurdlers:

- Increases the capillary beds in the muscles
- Will increase recuperation between hard bouts of work
- Helps you run rounds
- And more importantly, allows the body to recover the resources needed to keep running at a high level
- BUT! Aerobic training cannot make you faster!!!

So, know why you are doing the aerobic training and apply those principles to assist in the development of your sprinter's speed. The energy systems of the body need careful attention to detail when formulating your training plans. Running at 10 meters per second at practice will have a positive impact on any efforts below that, including the 7.14 and 7.86 meters per second previously mentioned in a 14.00 female and male hurdle race. Conversely, running at 5 meters per second for weeks at practice and then expecting a representative hurdle performance will result in negative race results due to locking out the faster rhythm due to the length of time training at sub-performance velocities with poor technical competency. The race will go beyond the muscular tolerance established running slower than the race demands.

The use of the chart that follows will enable you to train in the systems that you are going to be "swimming" in. If you want to train for speed, power, speed endurance, capacity, or tolerance, you can clearly see what the time frame is for accomplishing each task. The time frame will also keep you from over training kids who can't run the same distances of your more talented sprinters/hurdlers who can cover more distance due to their speed and power advantage. In other words, having your 16.00 hurdler doing the same tolerance work as your 14.00 hurdler is asking for trouble. The difference in their hurdle times exposes speed, power, strength, skill, and coordinative abilities. So, having the 16.00 hurdler run 6x150 at 90% like the 14.00 hurdler could be disastrous. After the first 2 or 3 reps, the 16.00 hurdler may need to exert 95%+ effort to keep running the workout goal. But if you break the workout into sets and manipulate the recovery between the sets and reps, the benefit could be just what you hoped. So, understanding not just distances, but how critical frames are, makes the instructional goal for the day fit the training laws of specificity since not everyone will be able to cover the same distance in the same amount of time.

However, you can make the time they spend doing the activity productive. Clyde Hart from Baylor often runs his men over distances of 600 meters but has used 550-550 meters to train his women because he wants to train the specific systems and he knows the time it takes for his women to run the paced 500 will be similar to what he wants the men to run for 600 meters. As an example, a 12.00 and an 11.00 sprinter may both have certain repeats for the day's workout, but the time they spend doing the reps will not be the same.

If I want 8 second runs at 90% effort with 6-minute recoveries could mean the 12.00 sprinter covers 55-65 meters, while the 11.00 sprinter run 65-75 meters in the workout. Under closer inspection, you may have to give the less skillful sprinter more recovery to make sure they are running not just the time and distances, but at the effort you desire. This point can be driven home even harder by keeping your 12.00 kids out of the 11.00 training group. The 12.00 kid will run faster than you want them to, just to stay in the mix with the 11.00 kids. And while they are blasting the faster, and harder reps, you lose the benefit of having them train their coordination, posture, skill, and relaxation.

Regardless of what distance they run, the critical training element is still going to be building their absolute (maximal) velocity first and then running at a % of that velocity for the longer reps. The faster I can run fly 30 meters, the more efficiently I can

run 100 meters. Then by taking a % of that top end velocity I can run faster at distances ranging from 150 to 300 meters at a % of the established top end velocity. The sprinter will be able to run longer, faster, with shorter recoveries due to a more developed aerobic/anaerobic threshold. Even if my boy can run 70 and my girl 77 seconds for a 500-meter time trial (7.14 and 6.50 meters per second respectively), it's still only 78% of the speed they would need to run 11.00 for the boy and 12.00 for the girl 100-meter sprinter. But if I can get a 3.00 for the boy and 3.30 for the girl in a fly 30 meters (resulting in 10.00 and 9.09 meters per second respectively), then the boy has run 10% faster than the demands of the sprint race and the girl gets an 8% boost. And not only does it help with their 100-meter performances, the added speed cushion will enhance their runs from 150 to 300 meters running at a percentage of the fly 30-meter time. Again, *"You Must Always get the Velocity You Need, to Run at a Percentage of It."*

Understanding the difference between speed "Development" (maximum speed runs of 7 seconds or less) and speed "Work" (endurance based fast running) is a critical element of your sprint/hurdler's training. Speed development represents the organism's attempt to train absolute speed, or the maximum velocity the body can attain. Speed work is taking the highest % of that absolute speed and extending the running distance as far as you can at the highest % of that top speed. Unfortunately, many coaches believe that speed development and speed work are one and the same. You cannot call runs less than the race distance "speed" merely because they are shorter. I have heard very competent sprint coaches call 200-meter reps speed development for the 400 meters.

How fast, how many sets, how many reps, how much recovery you allow, and how often you stress the body's systems all play into the organization of proper speed development. So, if your 800-meter boy is running 200's, that's speed work since it violates the 6-7 ranges associated with speed development (unless they can cover 200 meters in 6-7 seconds). Accelerations out to 60 meters (depending on the strength, power, and maturity of the athlete), fly runs with a 20-30-meter lead in, or runs up to 5-6 hurdles all constitute staying within the speed development parameters.

Once you have achieved the speed you need, it will then be possible to train the speed work distances to enable your sprint/hurdlers to endure at a as high a % of that top end velocity as possible. This is where training in the appropriate workout zones (as outlined on the energy systems chart following this page will show) comes in. Since the last 25% of every sprint hurdle race is where the medals are decided, you much be concerned with not just the "race pace", but the "win pace" as well. So, gaining a greater understanding of the energy available over time will allow you to get your sprint/hurdler on the line well trained to hit the necessary energy zones effectively. So, once you have figured out how fast they are, you can begin the process of getting them ready by plugging in workouts that force your hurdler to tolerate stress appropriate reps at paces that they can surpass in training, making repetitions at the race and win paces possible. The following chart will enhance the understanding of the energy systems and will allow you to call a workout what it really is and understanding what it's supposed to do. Only by modeling, and ***Planning the Race*** carefully, can your sprint/hurdler hope to ***Race the Plan*** with confidence.

Energy System Training

Session Duration	Energy System	Power/ Capacity	Training Effect
0 to 0.2 sec	Nervous System	CNS	Reaction

0 to 0.2 sec	Alactic (ATP)	Power	Initial Push
0 to 1.0 sec	Alactic/CP	Power	Single leg Thrust
1 to 2.0 sec	Alactic/CP	Power	Starts
2 to 5.0 sec	Alactic/CP	Power	Acceleration
5 to 15.0 sec	CP	Power	Fly Runs
15 to 30.0 sec	Extended CP	Capacity	Speed End.
30 to 45.0 sec	Láctate	Capacity+	Produces Energy w/o O2 or CP
Session Duration	Energy System	Power/ Capacity	Training Effect
45 to 90 sec	Lactate	Capacity+	Ability to Tolerate LA

90 to 300 sec	Lactate with O2 Support	Lactate Capacity Aerobic Power	Using O2 as LA Builds
5 to 10 min	Aerobic with limited Lactate	Aerobic Capacity and Power	Maximizes O2 Rates
10 to 12min	Aerobic	Aerobic Power And Capacity	Anaerobic Thres. Rises
20 to 30 min	Fuel: Glycogen	Capacity	Maintain Steady Pace

Part Four

Hurdle Training Components

“Adapt or Die” (Tony Wells)

The hurdle events have certain general and specific classifications which assist the coach in keeping the workouts on task and distinctive to the specific training demands and design for each day, week, month, and annual plan. The general classifications that need to be addressed are:

a. The development of speed. Always train speed first because it is the most difficult of the abilities to train between maximum velocity and aerobic enhancement.

Speed is over 20 times more difficult to train than aerobic improvement. If I jog one lap today, I am more fit than I was the day before. Aerobic enhancement is expandable, while speed is a determinant value sometimes requiring a year or more just to obtain a 2-3% improvement (but a 3% improvement can drop a hurdler from15.00 to 14.55!).

b. Strength is another general classification that must be addresses carefully with pre-pubescent sprinters and hurdlers. I mentioned earlier in the manual youth can obtain significant gains in their strength by doing skillful activities incorporating their own body weight. Always take into consideration that young bones and ligaments are like "Silly Putty" and because of this resiliency can fool a coach into thinking loading them in the weight room is ok. *Strength training involves moving heavier loads at slower bar speed.*

c. Power is closely related to speed because without it you're really fit, but not very fast. If I drop a V-8 engine into a P.T. Cruiser, it is more powerful, but has the extra weight check mated the power advantage? If I get more powerful, am I giving up something the sprint/hurdler does well? As you can see, each of these generalized qualities does not exist in isolation. So, when you make any changes in ***one*** Bio-motor Ability, you must be prepared for the commensurate effect on all the ***others***. Power = Force X Time – this training uses weights not as heavy as the strength parameters involving faster bar speeds explosively.

d. Coaching cues are just as important to the training plan as the other general classifications. What we say and what they hear (understand) can have two different meanings. Make sure you become bi-lingual as a sprint/hurdle coach so the words you use are understood by the receiver. A sprint coach may tell a boy to "stay low" during acceleration, and while the coach knows that staying low is a by-product of a powerful block exit from the legs and hips, the boy bends at the waist to execute what they understand the coach wants. Your hurdler should not need a PhD to keep up with you and discussions of "sagittal planes" are forbidden.

e. As coaches, we live in a very *cerebral world*, while our young people, who live in a very *sensual world*, must "feel" what we know. Don't give a dissertation after every block start. By the time they have executed 4 to five accelerations, what you saw on the first rep may no longer be an issue. But because you made it an issue on the first rep, and even though you are giving different cues, whatever you said on

the first start is still in their head. It's like telling someone "*not to think of a white elephant*." Pick 2 to 3 things that are critical for the day's activities and beat them mercilessly.

Now, the discussion of the hurdle events will now move to more specific classifications allowing you to narrow your training goals and themes. The more specific classifications include:

a. Hurdle acceleration workouts designed to get you through the first three barriers acting as the set-up for the top hurdle speed experienced later in the race. Standing long jumps into the sand, jumps into a sprint, 3 and 5 bound short jump routines, and uphill sprints serve to develop great starting strength and power specific to the hurdle acceleration. We cannot allow our young sprinters to "work their way into the hurdle speed". We should choreograph the race to establish as fast a split between hurdle one and two as is possible from the very start of the race. Too often the start is merely used to get you to the first hurdle and gradually reaching top race velocity as you go. But your hurdler should be thinking of attacking the race after from the first step of the blocks. Once the gun goes off, there's no warming up to the race or getting settled into your rhythm. Your start should get you to hurdle one at the velocity you want to run for the big time. The 100-meter hurdle and 110-meter-high hurdle events are run with an acceleration pattern similar to flat 100-meter races. But due to the restrictive nature of the set distances between the barriers, the hurdler must get up to rhythm velocity quickly, unlike the flat sprinter who can go through a more methodical acceleration pattern. If we don't teach an aggressive acceleration to the first and second hurdles, we coach them to be too slow early in the race. But if they are too slow early, any attempts to inject a burst mid race can be disastrous. In addition, such a burst can cause neuromuscular fatigue that can drop them out of late race contention. The whole point of the acceleration is to leave you with enough juice in the tank for speed maintenance and not another late race push. But if the acceleration frightens your hurdler because they feel the hurdles are coming at them too fast (too fast is FIRST PLACE!), they will throw their cut step well in front of their center of mass to slow things down to make the first hurdle clearance feel more comfortable. But that loss of first hurdle velocity requires your hurdler to attempt a race re-start after hurdle one, and that takes a lot of energy (both physiologically and psychologically). Let's look at what I am driving at as we examine two hurdle race patterns.

H1	2.64	2.71
H2	3.77-1.14	3.88-1.17
H3	4.88-1.11	5.02-1.14
H4	5.94-1.07	6.12-1.11
H5	7.03-1.07	7.23-1.09
H6	8.12-1.09	8.35-1.13
H7	9.24-1.10	9.50-1.13
H8	10.36-1.12	10.65-1.15
H9	11.49-1.14	11.82-1.17
H10	12.65-1.16	13.00-1.19
Finish	**14.20**-1.53	**14.60**-1.60

You can tell by the beginning differences of the first hurdle touchdowns of only 0.07 second will result in a 0.40 gap at the finish. As I remarked earlier, hurdle races follow a speed pattern, and if the early splits are too slow, you can't just surge without some sort of rhythm break being the result. So, after the first hurdle touchdown, the 14.20 hurdler already has a 0.07 advantage and the 2.64 split contributes to a 1.14 run to the 2nd hurdle touchdown. The 14.60 hurdler, already down, can't respond with a 1.14 or faster split to stop the bleeding because that kind of drop in time coming off a 2.71 touchdown would require an expensive Central Nervous System energy cost that will hurt in the later stages. Both hurdlers will reach a top end split around the 5th hurdle. But when 14.20 starts to tire, thanks to the first hurdle approach and early speed rhythm, they decelerate from a faster rhythm. You may feel the 14.60 hurdler just isn't fast enough to match the speed rhythm of the 14.20 hurdler. That may be true, but what if the 14.60 hurdler never experiences low and close rhythms to mimic 14.20 (or faster) at practice? What if this hurdler only runs 33" hurdles set at 8.50m every time they hurdle? Is the hurdle coach "locking" in an inescapable hurdle rhythm at practice the hurdler can't break out of at the meet? After the first touchdown, the 14.20 hurdler is only 0.034 seconds better each hurdle (not an insurmountable problem to overcome). As a sprint/hurdle coach, you've

got to figure out a way to get 0.04 per hurdle out of your kid. If you've tried everything in your speed and hurdle development toolbox, then so be it. But if not, you're doing your kid a disservice by not trying to attend to the general and specific classification training necessary to run at their optimum. So, one way to teach the aggression of the first hurdle clearance and faster first hurdle units (from hurdle 1 touchdown to hurdle 2 touchdown) is having hurdle one significantly lower which lowers fear and hesitation. Here's an example of such a workout:

- The workout incorporates running over 5 hurdles from the blocks.
- The first run uses hurdles set at 30" and 7.5 to 8.0 meters
- The second is the same run, but hurdle 5 is at 33".
- The third run has hurdles 4 & 5 at 33"
- The fourth run has hurdles 3-4 & 5 at 33"
- The fifth run has hurdles 2-3-4- & 5 at 33"
- You never raise the hurdle height of the first clearance to ensure you have a high velocity coming off the first hurdle. This ensures a fast split between hurdle 1 and 2. Many young hurdlers fail to reach max hurdle speed, so they panic and start to reach for each successive hurdle. This drill gives them a big pop between hurdle one and two and results in a higher race velocity up to hurdles 5-6 & 7.

b. Absolute speed comes from the development of maximum velocity in the general classification, but now you begin to build this speed into specific hurdle movements of hurdle acceleration, take-off, touchdown, shuffle, and finish techniques. Top speed hurdle mechanics require a high level of coordination and balance due to the constant changing of body positions involved in a hurdle clearance.

c. Rhythm endurance is speed endurance work over hurdles requiring your hurdler to perform top end and late race movements beyond the number of clearances you would normally find in their race. This training also allows your hurdler to tolerate the effects of fatigue and sustain highly technical race rhythm. Examples of rhythm endurance includes:

1. 12 hurdle runs with the barriers 20-30 centimeters closer to force a consistent run between in the face of growing fatigue.
2. 12 hurdle runs set 30 centimeters closer to start, and after five clearances, reduce each successive hurdle by 10 centimeters to keep the hurdles flying at your hurdler forcing them to keep the shuffle mechanic at a high frequency.
3. Down and back hurdle routines using five hurdles in each direction with the first set of five hurdles set close and the return trip even closer.
4. Run 4-6 x 8 hurdles with 8 minutes between.
5. "Lyle eight hurdle drill" is something I was shown by the late, great Dr. Bert Lyle, from Denton, Texas. This drill allows your hurdler to reach faster early race velocities which make the transition to top hurdle speeds easier. The workout uses 8 hurdle clearances from the blocks (I will use a high school boy hurdle routine to show the drill).
    a. Run 1x8 hurdles set at 8.80 meters and 30"
    b. After a 6 to 8-minute recovery, repeat the set with the first four hurdles at 30" and the second four set at 33".
    c. In the 3rd set, all 8 hurdles are set at 33"
    d. In the 4th set, the hurdles are set at 33"/36"
    e. In the 5th set, the hurdles are all at 36"
    f. In the final set, the hurdles are set at 36/39"

    This is a very stressful training day, so make sure your kid is fresh going in and has several days to recovery post workout. I have used this with my girls incorporating 20" for all 8 hurdles, and then 20"/24", all 24", 24"/27", all 27", 27"/30", all 30", then 30"/33". If your hurdlers are young or newbies, run half or 2/3rds (Robert H. Johnson) of this session.

d. Long and multi-jump routines that use as few as 10 bounds and as many as you can while covering 100 meters (only in extreme cases). These repetitive jumps emphasizing speed of movement can have a positive impact on the younger

athletes who lack skill, coordination, or access to traditional strength and weight training opportunities. Single leg hops are also quite helpful teaching the hurdle how to stabilize ground contacts running into and off hurdles. Run-run bound routines over baby hurdles can also serve the hurdler well since bounding and the hurdle stride are quite similar.

Part Five

Hurdle Drills and Qualities for Boys and Girls

"Always Do the Right Thing, People Hate That"

Determine what the Demands of the Race are and Beat it till it Bleeds!

If it ain't broke……..……***BREAK IT***!!!

Training Demands

1. How long the event lasts will tell you volumes about how to train for it.
2. Identifying the dominant energy systems will tell you what to train it with.
3. Identify your sprint/hurdler's strengths and weaknesses. Trying to eliminate a weakness is a brick wall you'll endlessly bang your head against. By virtue of its name, *it's weak*. Spend your time taking your strengths to new levels in the hopes of limiting the weaknesses' effect on your event.
4. Be careful making radical changes in strength, power, and/or the technical component. Increasing your strength by 20% could result in a loss in other areas. Years ago, in a Junior Elite training camp in San Diego, we identified a sprinter who had great stride length values but needed to work on her stride rate weakness. The young lady qualified for the camp the next year and improved her stride rate by 13%. The problem was this significant improvement in her rate caused a 12% drop in her length and she ended up running the same time from the previous year. She increased her power levels through massive improvement in the weight room, but the change was checked mated by an additional 9 pounds of body weight
5. Make sure you separate the sprint rhythm and the hurdle days in the weekly training themes. If your killer hurdler is also a very good sprinter, have them finish their sprint specific day with some very low and very close hurdling to remember your hurdle dynamics. For hurdlers who sprint, and have separate sprint and hurdle coaches, making sure both coaches are invested in the hurdle rhythm being protected is critical. This approach can be used at meets after your hurdler runs the short relay, 100 and/or 200 meters.

Part Six

The Long and Short of It

"You've Got to be Half Crazy to be a Hurdler, and Some are Overqualified" (*Loren Seagrave*)

The long hurdle event (300LH/300IH/300LH/400IH) was for quite some time contested at 180 yards on both the straight and the turn. The 180-yard distance was the longest hurdle distance for high schoolers until 1974 when the 300-yard low hurdles (30") were introduced to high school boys. The race was run for yards since most tracks in the US were on 440-yard tracks until 1980 when the National High School Federation recognized the metric distance. The 300-meter distance was added to the girl's schedule in 1981, also using a 30-inch barrier. The boy's hurdle height was changed to the now recognized 36 inches in 1984.

In high school, the long and short hurdle races present unique challenges for the sprint/hurdle coach. The movements up to and over the barriers cause the hurdler to manage different clearance techniques which can cause some confusion for the 100m/110m and 300m hurdler. The sprint hurdle approach is an aggressive attack to the first barrier followed by short airtimes for the women's race and slightly longer airtimes for the men. However, the approach, takeoff and touchdown mechanics of the long hurdle events needs less aggressive approach movements. The short hurdler now sees their approach expanding from 13.00/13.72 meters to 45 meters, requiring a more 400 meter-like start. The aggressive sprint hurdle movements take a lot more strength and power output and are well suited for a race covering 100 to 110 meters, but conversely present a real problem of energy economy when trying to cover 300 to 400 meters. Some hurdlers can get away with sprint hurdle mechanics over 300 meters when they can run under 40 seconds where lactate becomes less of a problem. But if you are using sprint hurdle mechanics over 400 meters, or you are a 40+ boy, or 45+ girl you're really asking to break down in the later stages of the race.

How many times have we've seen a young man or woman lead for 7 hurdles only to give away their advantage crashing, or adding an unnecessary step (or steps) to the 8th barrier dashing their hopes for a fast time, a PR, or a state title? The 8th hurdle did not mysteriously rise a few inches, so why does this happen? When you combine the more aggressive sprint hurdle movements with a race that lasts from 37 to 55 seconds (touching on the fringe of lactate to swimming in it!), the energy demands, and technical considerations come under increased stress and fatigue. Approaching and extending beyond 40 seconds of near maximal effort, the amount of lactate in the blood increases significantly. Once this happens, the body's ability to produce forceful movements becomes severely limited, precipitating late race hurdle hits.

The short hurdle race lasts between 13 to 17 seconds depending on the quality of hurdling done, but the 300-meter hurdle race can last as long as 55 seconds for some kids (dipping heavily into the lactate acid system). If you check your energy system chart, a 17 second short hurdler is still operating in the Alactic/Creatine source, while a 55 second 300 hurdler bleeds through that time frame and bumps their head on Lactate/Capacity (low power). Now your first reaction is to surmise, "more endurance is needed", and you would be right, to an extent. But the quality of your endurance is contingent upon the quality of your absolute speed abilities. Getting your hurdler as fast as you can will yield a % of that absolute speed dedicated to time frames where your 300-meter hurdler currently lives or wishes to go. Getting your 300/400 hurdler as fast as they can get will make race velocities easier to manage, increasing running economy and technical competency. A boy running 23.3 for 200 meters has a 10% speed cushion making 38.35 in the 300 hurdles more manageable. A girl running 26.0 for 200 meters has a cushion representative of 43.48. Now, this is just one end of the spectrum. Your hurdler will also need:

1. Improved special endurance (lactate tolerance/capacity)
2. Efficient hurdle mechanics under duress
3. Improved strength endurance
4. Improved strength/power (inside and outside the Wt. Room)
5. Improved flexibility and relaxation

Getting back to long hurdle technical demands, the cut step or hurdle attack take-off step discussed earlier is still a critical technical cue for the long hurdler. The 300-400-meter hurdler's close to center of mass take off is even more critical in the later stages of the long hurdle race where a take-off step well in front of the body's center can prove disastrous. Keeping the cut step close to the body will reduce braking and will preserve the hurdler's momentum from the moment they leave the ground until they achieve touchdown. The cut step is less violent and allows for a slightly longer clearance time. The longer clearance time (sometimes unnoticeable) allows time for the hurdler to let the barrier pass underneath them giving the hurdler a more rhythmic recovery like the race tempo. The lead foot no longer must work toward the ground as soon as it clears the top of the hurdle board as aggressively as in the shorter events. The lead arm is not as

forceful and reaches outward in a more deliberate manner taking a little more time to perform the action. It is a less deliberate movement, but not a *"slower"* movement.

The touchdown off the hurdle is less aggressive, but not slow, not needing a big snap from the lead-trail action. On a side note, I have been taking parts of the hurdle take-off, clearance and touchdown describing them in isolation. But the hurdle action is a fluid combination of both legs and arms acting like a teeter-totter working to achieve high level balance and coordination. So, when I say it's a less aggressive movement over the hurdle, I am not asking your hurdler to hold the movements back. The movements still are designed to bring the hurdler up, though, and over the hurdle in a smooth and controlled manner, setting up a smooth transition to the next hurdle. Using slightly less dynamic hurdle movements lets the hurdler maintain efficient take-off, clearance, touchdown, and run-away without hurting the hurdler's ability to sustain their technical competency as fatigue becomes more serious. In addition, young women spend more time on the track than young men, so you may have to spend a little more time on their race endurance, tolerance, and capacity.

Part Seven

The Rhythm Method

"Either I Win, or *I Learn*"

High Performance Hurdling

Let's look once more at the differences between great and average hurdling:

Hurdlers	**Allan Johnson (12.91)**	**Harry-Hit-A-Hurdle (15.55)**
Steps to H1	8	8
Steps Between	3	3
Hurdle Clearances	10	10
Steps to the finish	5	5
Total Steps	50	50

Hurdlers	**Dawn Harper (12.41)**	**Becky Bang-a-Barrier (14.99)**
Steps to H1	8	8
Steps Between	3	3
Hurdle Clearances	10	10
Steps to the finish	5	5
Total Steps	50	50

With both the elite and the slower hurdler taking the same number of steps in these examples reveals stride frequency as the "limiting" factor in the sprint hurdles and this quality must be protected at all costs. Do not teach your hurdlers to 4-step unless you're working on their ability to alternate for the long hurdle race. You limit your short hurdler's development because as they move deeper into the season, they will get faster

and a 4-step rhythm will eventually force your hurdler to slow down due to being forced to take too many steps between the barriers (similar to how a 5-step pattern results in slow hurdle times).

Since the key to big-time hurdling is frequency between the sticks, you'll find world class and average hurdlers use almost identical stride lengths. But the projection of force for the elite hurdler is "down the track," while the average or everyday hurdler is "up and down the track." The frequency difference is not just a fast shuffle, but the force from the hips and into the lower legs generating the speed. The rhythm between the hurdles must be artificially generated at practice to enable your hurdler to "feel" what you want them to feel the day of the race. If you feel your boy can run 14.60, use this formula to work out hurdle rhythm work.

14.60 = finish/goal time

14.60 – 2.71 (run to first touchdown) = 11.89

11.89 – 1.60 (off hurdle 10 to the finish) = 10.29

10.29 / 9 remaining hurdle clearances = 1.15 (rounded up)

9.14 meters (distance between the hurdles) / 1.15 = 7.95 meters

Now you have the distance between the hurdles you'll want your boy running so he can feel the speed of 14.60, as well as develop the visual acuity (steering) necessary to run that rhythm during the race. You must duplicate the pace in which the hurdles are going to fly at your kid, so they can time up their shuffle and clearance mechanics. Whenever you try a new drill like this, keep the hurdles a notch or two lower to allow for the timing to be acquired without the fear that can come with faster hurdling. Let's say after two months of 7.95-meter hurdle runs your boy starts to drop 5 or 6 1.13's in a row for 2 or 3 sets:

1.13 x 9 = 10.17

10.17 + 2.71 + 1.60 = 14.48

In addition, 1.13 hurdle "rhythmic units" change your average touchdown distance from 7.95-m/s between the hurdles to 8.10-m/s. A new PR of 14.48 could win a good number of state meets. If we assume the new1.13 units also yield a faster first hurdle touchdown and run to the finish (10.17 + 2.64 + 1.55), a USATF Junior Nationals

qualifier of 14.20 is possible. It becomes possible for the sprint hurdle coach to "choreograph" the type of race you want your kid to run or become comfortable with.

Part Eight

Specific Exercises for Hurdlers

"It **Never** Gets Easier, You Just Get **Better**"

Before getting into the exercises that make your hurdler go from average to exceptional:

Hurdle fault and correction work is one way the hurdle coach can enable the young as well as experienced hurdler achieve breakthrough performances. As in all events in track and field, the fault or error a coach can observe is not when and where they see it. If we use a more Sherlock Holmes approach to error detection, we can fix far more flaws in our hurdler's technique. Holmes would always say that his deductions were "elementary," meaning the answer to the crime was fundamentally easy to comprehend. When we use the elementary approach to hurdle flaw correction, we need to look "upstream" from the error or find the flaw before the flaw manifests itself into poor technique. An excessive vertical take-off cannot be coached by telling your hurdler to snap the lead leg down. If we observe the 2 or 3 steps prior to the take-off, we can see what adversely caused the problem. The hurdler may have touched down from the previous hurdle with a flat touchdown, causing the trail leg to slow down and reach out, again resulting in a flat foot plant resulting a long stride bringing the hurdle too close to the hurdle forcing the hurdler to jump up to avoid hitting the barrier.

There are tons of hurdle correction drills out there for coaches to have access to, but I wanted to describe a set of ten drills I believe can help the coach and hurdler achieve success.

Correction Drills

1. Hurdles placed at 8.00 to 8.30 (8.60 to 8.80 meters for men) meters apart. This improves hurdle speed up to the 6th hurdle and at least up to the 3rd hurdle for less experienced hurdlers.
2. Running over low hurdles set at 24" to 36" with the spacing set at 7.00 to 8.50 meters. A significant improvement in average speed up to the 5th hurdle is acquired. An improvement in rhythm ability is also developed.
3. Five stride hurdling with the hurdles set at 10.00 to 12.00 meters apart. The last stride before the hurdle becomes significantly faster and the support time of the last stride is reduced. Average speed and frequency is improved by 4% and 7% respectively. *Since five stride hurdling can change and/or lengthen the hurdler's stride length, an alternative the can still meet the goal of increasing speed and frequency involves placing a very low hurdle (as low as 60cm or 2 feet). Running over the lower hurdle with speed forces fast clearances and helps to generate more frequency between the hurdles. A workout would entail 6 to 8 hurdles with the first, third, and 5th hurdles at 60cm. The hurdles are set at 7.5m/8.5m apart for men and women respectively for the entire run.*
4. Hurdling with the distance between the hurdles gradually reduced gradually reduced 10 centimeters at a time starting from clearance after the first hurdle (8.50-8.40-8.30-8.20-8.10-etc.). This drill improves speed between the hurdles.
5. Running over the hurdles with the lead leg only clearing the hurdle. Hurdlers performing this drill will improve hurdle performance by 2.2%. Average speed and stride frequency is also improved by 2% and 3% respectively. A performance quality of this drill is the shortening of the time taken for each stride, while the stride length remains the same (this is a good thing). Shuffle mechanics are also improved.

6. Running a three-stride rhythm using a hurdle simulation (no hurdles with pieces of tape on the track representing the hurdle). Hurdle flight times and hurdle flight distances decreased by 16%. Performance improved by 12%, and stride frequency was improved by 9%.
7. Hurdling on a surface with a slight (2 degrees) decline from the 3rd hurdle (where average hurdle speed can drop for the young hurdler). This exercise demands a stronger hurdling action and the holding of the average hurdle speed. Average speed goes up by 4%, and frequency is improved by 5%. The decline in the loss of hurdle speed was reduced by 3.3%.
8. Towed hurdling, using a pulley system can improve overall performance by 2.7%. Frequency is improved by 2.7%, and support phases between the hurdles (keeping ground contacts underneath the hips with each step) dropped by 10%. Flight times and speed over the hurdles was decreased by 8% and 5% respectively.
9. Hurdling with a change of the hurdle distance between the 3rd and 4th hurdles to 7.50 meters (for girls) and 8.50 meters (for boys). Stride frequency increased by 4% and the average speed after the change remained higher in the later stages of the run where speed normally drops off. This drill would require you run an additional 3 to 4 hurdles after the change so the hurdler can adapt to the change in frequency.
10. Hurdling with a change of the hurdle distance to 10.00 and 12.00 meters apart. Average speed between the 3rd and 4th hurdles is increased by 3%. This also keeps average hurdle speed high during the later stages of the run like exercise #9. This drill would require you run an additional 3 to 4 hurdles after the change so the hurdler can adapt to the change in velocity.

Coaches, be careful using any new hurdle or sprint drills with your young people. It's better to under plan a new skill training day than running too many and cause bad running mechanics, or worse yet, an injury. Sets, reps, and recovery should make it easy for your young people to acquire the new skill (and recover for the next training session).

Performance Categorization & Skill Matching

Skill Level	**Hurdle Exercises**
Beginners	3-2-1
17.60	1-2-3-5-7-10
16.35	3-10-7-9-2-1-5
15.30	6-7-10-8-9-3-5-1
14.44	7-3-4-1

Technical Task Development	***Hurdle Exercises***
Running between the hurdles	
By shortening the support phase	4-3-8-5
Decreasing stride time	8-5-6
Increasing Stride Frequency	3
Increased speed of the last	
Steps before the hurdle	3-8-6
Increased speed of the	
Hurdle clearance	6-7-8-5-1-3
Increased average speed at	
places where speed is low	7-9-10-2
Maintaining average speed	7-10-2

300 Meter Hurdle Drills

Just as in the short hurdles, the long hurdle races (300 & 400 meters) can be enhanced by using certain drills to duplicate certain stages in the race to address race flaws. Any of the short hurdle drills previously list can be used to train the stamina and endurance needed for the longer races by cutting the recovery and pumping up the number of reps and sets. But just like the short hurdle races, event modeling is critical to giving the long hurdle a sense of relaxation and control. Event modeling for the long hurdles means setting the race up in part-part-whole segments to train the energy systems that are present during each stage of the race. As a reminder about the energy systems requires that I repeat the fact that these systems are not separate faucets that turn on and off after certain periods of time. When in fact all the systems available for sprint or hurdle activity are simultaneously present and are only exhausted after their time frame and intensity are spent. Running the full distance at practice to "toughen" or callous your hurdler, can actually ingrain bad habits when the hurdler attempts to re-create a competitive effort without the presence of meet day hype. However, running the event using lower and closer hurdle distances can allow you to run bigger chunks of the race which can model the exact race rhythm you hope to see on Saturday.

300 Meter Event Modeling

a. The first 3 hurdles are adrenalin, so resist the urge to try and win it here (don't over run the race).
b. Hurdles 4-5-6 is where the race really starts to develop.
c. Hurdles 7 & 8 are where the medals are decided.
d. Your race modeling day needs to be able to address each one of the areas outlined above.
e. Run 5-9x the first 3 hurdles. The reason for as few as 5 and as many as 9 gives you the ability to decide when they have had enough. They might start to show fatigue earlier than another kid who can endure 8 or 9 runs over three hurdles.

f. Only mix hurdle rhythms on rare occasions so you can tighten up their practice hurdling. Since most young people have to run both races, it may be necessary to run starts over the first 3-5 hurdles set low and close, followed by a short water break. After the break, you can run reps over any of the rhythm zones outlined in a-b or c above.

g. Strength endurance runs including stairs, hills, sand, and sleds are a few of the methods available to develop a tougher kid who can weather the mounting fatigue and stay locked into the rhythm and technique.

h. Everything you do in the endurance capacity of your preparation is designed to train the ability to attack late stage hurdles in the face of increasing fatigue.

i. Change the spacing between the hurdles when fresh and fatigued at practice to improve their "steering" or ability to pick up the hurdle and time up their run over the hurdle.

Long Hurdle Run Around Day

a. Run 1-2 x the first 5 hurdles with a walk back recovery.

b. Stand on the touchdown side of hurdle one and run over hurdles 2-3-4-5 (walk back recovery).

c. Stand on the touchdown side of hurdle two and run over hurdles 3-4-5-6 (walk back recovery).

d. Stand on the touchdown side of hurdle three and run over hurdles 4-5-6-7 (walk back recovery).

e. Stand on the touchdown side of hurdle four and run over hurdles 5-6-7-8 (walk back to the last 100 meters and run over hurdles 6-7-8-finish).

Other Long Hurdles Reps

a. Set up 3 lanes of hurdles over 100 meters set at random distances.
b. 300-meter reps with the hurdles spaced randomly.
c. Hill reps with even and odd step patterns (very low hurdles).
d. 500-600 meters at 75% effort with the last 200 meters run aggressively over hurdles (keep the hurdles low doing this the first time).
e. 200 meters flat, 90 seconds rest, then 200 meters over hurdles.
f. 200 meters over hurdles, 90 seconds rest, then 200 meters flat,
g. 300 meters with the first 100 meters flat and the last 200 over hurdles.

Step Pattern Work

The following step pattern drills are very good when trying to add specific rhythm work to your hurdle training day. I want to thank my hurdle mentor and elite coach Gary Winckler for allowing me to share this with you.

Step Pattern	*Workout Steps*	*Spacing*	*Approach*
17 steps	5 steps	12.25m	15.00m
17 steps	5 steps	13.00m	15.00m
17 steps	7 steps	16.00m	15.00m
16 steps	7 steps	17.00m	15.00m
15 steps	7 steps	17.90m	15.00m
17 steps	9 steps	19.80m	30.00m
16 steps	8 steps	19.00	30.00m
15 steps	9 steps	22.20	30.00m

Hurdle Split Sheets

The following split sheets for the long and short hurdles are not meant to represent absolute touch down times but should serve as a guide to how a good hurdle race should progress. Your hurdler may run faster or slower at certain pace markers and still end up with the calculated time. But these charts can serve as an indication of a race rhythm flaw. By using the charts, you can construct workouts that mimic the actual race model so a smoother race pattern can be achieved. The charts can help the hurdle coach identify any "extreme" changes in pace or rhythm which could be the reason why "Harry" or "Becky" run 14.5 for the first five hurdles but run 16.22 at the finish.

Men's 110mHH Splits

14.40	14.60	14.80	15.00	15.20	15.40
2.67	2.71	2.75	2.79	2.82	2.86
3.83	3.88	3.93	3.99	4.04	4.09
1.15	1.17	1.18	1.20	1.22	1.23
4.95	5.02	5.09	5.15	5.22	5.29
1.12	1.14	1.15	1.17	1.18	1.20
6.04	6.12	6.21	6.29	6.37	6.46
1.09	1.11	1.12	1.14	1.15	1.17
7.13	7.23	7.33	7.43	7.52	7.62
1.09	1.11	1.12	1.14	1.15	1.17
8.24	8.35	8.47	8.58	8.70	8.81
1.11	1.13	1.14	1.16	1.17	1.19
9.37	9.50	9.63	9.76	9.89	10.02
1.13	1.15	1.16	1.18	1.19	1.21
10.50	10.65	10.79	10.94	11.09	11.23
1.13	1.15	1.16	1.18	1.19	1.21
11.65	11.82	11.98	12.14	12.30	12.46
1.15	1.17	1.18	1.20	1.22	1.23
12.83	13.00	13.18	13.36	13.54	13.72
1.17	1.19	1.20	1.22	1.24	1.25
14.40	14.60	14.80	15.00	15.20	15.40
1.57	1.60	1.62	1.64	1.66	1.69

Boy's 110-meter-High Hurdle Evaluations

Time	14.80	14.10	13.60	13.10
Block 30m	4.28	4.19	4.09	4.01
Fly 30m	3.05	2.89	2.74	2.72
100m PR	11.40	10.95	10.55	10.35
200m PR	22.95	21.70	21.00	20.60
100/HH Diff.	3.40	3.15	2.95	2.75
10m Bound	32-35m	35-38m	36-39m	38-41m

Split Times for the Boy's 300mIH

6.10	6.30	6.40	6.50	6.60	6.70
10.40	10.70	10.90	11.10	11.30	11.50
4.30	4.40	4.50	4.60	4.70	4.80
14.70	15.10	15.40	15.70	16.00	16.30
4.30	4.40	4.50	4.60	4.70	4.80
19.00	19.50	19.90	20.30	20.70	21.10
4.30	4.40	4.50	4.60	4.70	4.80
23.30	23.90	24.40	24.90	25.40	25.90
27.60	28.40	29.00	29.60	30.20	30.80
4.30	4.50	4.60	4.70	4.80	4.90
32.10	32.90	33.70	34.40	35.10	35.70
4.50	4.50	4.70	4.80	4.90	4.90
36.70	37.60	38.50	39.40	40.10	40.70
4.50	4.60	4.70	4.80	5.00	5.00
37.70	38.70	39.60	40.60	41.30	41.90
1.00	1.10	1.10	1.20	1.20	1.20

300 Meter Hurdle Speed Comparisons

Boy's Comparisons

300IH Time	200 meters	400IH	400 meters
37.00	21.75	52.54	47.85
37.50	22.05	53.25	48.50
38.00	22.33	53.96	49.14
38.50	22.63	54.67	49.79
39.00	23.06	55.38	50.74
39.50	23.22	56.09	51.08
40.00	23.51	56.80	51.73
40.50	23.81	57.51	52.38
41.00	24.10	58.22	53.02

Men's 400-meter Intermediate Hurdle Pace Chart

Time	**52.50**	**53.25**	**54.00**	**55.40**	**56.00**	**56.80**
H1	6.34	6.43	6.52	6.69	6.76	6.86
H2	10.45	10.60	10.75	11.03	11.14	11.30
split	4.11	4.17	4.23	4.34	4.38	4.45
H3	14.61	14.81	15.02	15.41	15.57	15.81
split	4.16	4.21	4.27	4.38	4.43	4.50
H4	18.85	19.11	19.38	19.89	20.09	20.40
split	4.24	4.30	4.36	4.48	4.52	4.59
H5	23.18	23.50	23.84	24.46	24.71	25.09
split	4.33	4.39	4.46	4.57	4.62	4.69
H6	27.61	27.99	28.39	29.13	29.42	29.89
split	4.43	4.49	4.55	4.67	4.71	4.74
H7	32.16	32.61	33.07	33.94	34.28	34.82
split	4.55	4.62	4.68	4.81	4.86	4.93
H8	36.93	37.45	37.98	38.98	39.38	39.95
split	4.77	4.84	4.91	5.04	5.10	5.14
H9	41.87	42.46	43.06	44.19	44.64	45.30
split	4.94	5.01	5.08	5.21	5.26	5.34
H10	46.85	47.52	48.19	49.45	49.96	50.70
split	4.99	5.06	5.13	5.26	5.32	5.40
finish	**52.50**	**53.25**	**54.00**	**55.40**	**56.00**	**56.80**
split	5.66	5.75	5.83	5.98	6.05	6.10

Women's 100mLH Splits

2.75	2.79	2.83	2.87	2.91	2.95
3.87	3.93	3.98	4.04	4.09	4.15
1.12	1.14	1.15	1.17	1.18	1.20
4.95	5.03	5.09	5.17	5.23	5.31
1.08	1.10	1.11	1.13	1.14	1.16
6.02	6.12	6.19	6.29	6.36	6.46
1.07	1.09	1.10	1.12	1.13	1.15
7.07	7.19	7.27	7.39	7.47	7.59
1.05	1.07	1.08	1.10	1.11	1.13
8.15	8.29	8.38	8.52	8.61	8.75
1.08	1.10	1.11	1.13	1.14	1.16
9.25	9.41	9.51	9.67	9.77	9.93
1.10	1.12	1.13	1.15	1.16	1.18
10.37	10.55	10.66	10.84	10.95	11.13
1.12	1.14	1.15	1.17	1.18	1.20
11.49	11.69	11.81	12.01	12.13	12.33
1.12	1.14	1.15	1.17	1.18	1.20
12.62	12.84	12.97	13.19	13.33	13.54
1.13	1.15	1.16	1.18	1.20	1.21
13.80	14.04	14.18	14.42	14.58	14.81
1.18	1.20	1.21	1.23	1.25	1.27

Girl's 100 meters Low Hurdle Evaluations

Time	14.10	13.65	12.90	12.60
Block 30m	4.72	4.70	4.46	4.38
Fly 30m	3.26	3.20	3.10	3.04
100m PR	12.60	12.00	11.80	11.50
200m PR	25.80	24.50	23.40	22.85
100/LH Diff.	1.50	1.35	1.10	1.10
10m Bound	19-23m	22-26m	24-25m	28-32m

Split Times for the Girl's 300mLH

7.20	7.40	7.60	7.70	7.90	8.00
12.20	12.50	12.80	13.00	13.30	13.50
5.00	5.10	5.20	5.30	5.40	5.50
17.30	17.60	18.10	18.40	18.80	19.10
5.10	5.20	5.30	5.40	5.50	5.60
22.50	22.90	23.50	23.90	24.40	24.80
5.20	5.30	5.40	5.50	5.60	5.70
27.70	28.20	28.90	29.40	30.00	30.50
5.20	5.30	5.40	5.60	5.60	5.70
33.00	33.60	34.40	35.00	35.70	36.30
5.30	5.40	5.50	5.60	5.70	5.80
38.30	39.00	39.90	40.60	41.40	42.10
5.30	5.40	5.50	5.60	5.70	5.80
43.70	44.50	45.50	46.30	47.20	48.00
5.40	5.50	5.60	5.70	5.80	6.00
44.90	45.80	46.80	47.60	48.60	49.40
1.20	1.30	1.30	1.30	1.40	1.40

300 Meter Hurdle Speed Comparisons

Girl's Comparisons

300IH Time	200 meters	400IH	400 meters
43.00	24.70	59.77	54.34
43.50	24.98	60.47	54.97
44.00	25.27	61.16	55.60
44.50	25.56	61.86	56.24
45.00	25.84	62.55	56.86
45.50	26.13	63.25	57.50
46.00	26.42	63.94	58.13
46.50	26.71	64.64	58.76
47.00	26.99	65.33	59.39

Women's 400-meter Low Hurdle Pace Chart

Time	**60.50**	**61.35**	**62.00**	**62.60**	**63.50**	**64.50**
H1	7.30	7.40	7.48	7.56	7.66	7.79
H2	12.04	12.20	12.33	12.46	12.63	12.84
split	4.74	4.80	4.85	4.90	4.97	5.05
H3	16.83	17.06	17.24	17.41	17.66	17.95
split	4.79	4.86	4.91	4.95	5.03	5.11
H4	21.72	21.96	22.25	22.47	22.79	23.16
split	4.89	4.90	5.01	5.06	5.13	5.21
H5	26.71	27.02	27.37	27.63	28.03	28.48
split	4.99	5.06	5.12	5.16	5.24	5.32
H6	31.80	32.18	32.59	32.90	33.37	33.91
split	5.09	5.16	5.22	5.27	5.34	5.43
H7	37.05	37.50	37.97	38.33	38.88	39.50
split	5.25	5.32	5.38	5.43	5.51	5.59
H8	42.55	43.08	43.61	44.03	44.66	45.37
split	5.50	5.58	5.64	5.70	5.78	5.87
H9	48.24	48.85	49.44	49.91	50.63	51.43
split	5.69	5.77	5.83	5.88	5.97	6.06
H10	53.99	54.68	55.33	55.86	56.67	57.56
split	5.75	5.83	5.89	5.95	6.04	6.13
finish	**60.52**	**61.35**	**62.02**	**62.62**	**63.52**	**64.52**
split	6.53	6.67	6.69	6.76	6.85	6.96

Training keys

Compatibility – don't mix systems
Evaluate the plan & race model.
Hurdlers are sprinters and not distance runners
Recovery is critical to development – especially for younger athletes -
Rest is one of the good **"4-letter"** words

Sample - Week 14

Monday – warm up – drills – 6-8 starts over 2HH and finish with 6-8 minutes rest – warm down - lift

Tuesday – w.u. – drills – hurdle mobility – med ball – technique striders – w.d.

Wednesday – w.u. – drills – 3x3x60m accels@90% - or relay handoffs - lift

Thursday – w.u. – drills – 4x4x100 @ 80% with 50m walk/reps and 200 walk/sets – w.d.

Friday – w.u. – drills – 6x12" hurdles at 6 meters and quick shuffle between – ready recovery

Saturday – 8-10 x 90-meter hills @90% and 3 mins. Recovery or rest here changes the intensity of Thursday & Friday

100-200 & 400 Meters

"Going Out on a Limb is dangerous, But That's Where the Sweetest Fruit is"

The 100, 200, and 400 meters are sprint races with different competition requirements, inexorably linked by one unavoidable and critical element: SPEED! Raw, unabashed, pedal to the metal, absolute speed. This is the main ingredient for success in the sprint events (as it is with the hurdles) and the final arbiter if you are going to run fast in either of the three sprint disciplines. And to add to your coaching dilemma, you are faced with a boy or girl who can:

a. Run on your 4x1, 4x2, 4x4

b. Is your best 100-200 person

c. Is your best 200-400 person

d. Is your best 100-200-400 person

e. And can even give you a 4x800, Sprint Medley, or DMR leg.

How do you train someone with such a wide range of top speed and speed endurance abilities bleeding through several energy plains? The young and developing sprinter must also deal the accumulative stress of a long track season (including an indoor and outdoor campaign and in some cases over 20 weeks of training), a long school year, the rigors of being a teenager/young adult, puberty, boyfriends, girlfriends, playing more than one sport, having a job, no parental support, or even a messy divorce. All the training you put your sprinters through can be turned to dust by the 22 hours they are away from you. So, do not become ***handcuffed by the plan.*** Answer the following questions before starting on the journey of sprint coaching:

1. How do you give them enough speed development base?

These are all critical areas that will be covered in this portion of the sprint/hurdle manual. But notice, the development of a speed development "BASE" is very, very important. You wouldn't ask Usain Bolt, Or Alyson Felix to go on a 4-mile run. But I hear sprint coaches constantly saying they are going to train all their sprinters like 400-meter sprinters to make them ***stronger***. But what does that mean exactly? To many, it means running cross country in the fall, or running 30-40% slower than their sprint requirements at practice for weeks and even months. I've been told this is a "base" period for improving their aerobic foundation. But running so much slower than the race demand creates a training stereotype that is hard to break out of, and often results in injury when the coach injects speed work later in the track season. You would never ask a

distance coach to run acceleration work and fly runs all summer before the cross season starts, would you? Well, then why do we allow that same approach to control how we train our sprinters? If you want to achieve faster performances, you must achieve higher maximum velocities to allow for higher speeds at less than maximum speeds at practice.

2. How do you give them enough speed endurance base?

Speed endurance incorporates timed runs from 8 to 25 seconds, or 80 to 150 meters for many kids. Again, the word "Base" is being used here to recognize that each phase of a sprint requires a *base of what it is made of.* Know that as young people get older and stronger, the distance they will cover in the same amount of time will increase. To develop a good speed endurance base, you must first establish proper sprint mechanics using high velocity sprinting incorporating runs out to 60 meters (with recoveries between 2-4 minutes). Now that the top end is established, runs out to 150 meters (with recoveries in the 6-10 minutes) can be executed at a percentage of the developed top speed. Be careful however following the letter of the law too closely stretching things out to 150 meters. Only use runs that address the sprinters technical component under stress. Instead of repeat 150's, stay within the speed endurance parameters and run as far as your sprinter can maintain their technical competency (which could be 120's only or a 150-120-120-120-90-90 set). Speed endurance runs can greatly assist, support and improve the technical aspects of maximal sprinting by running at a percentage of maximum speed under stress.

3. How do you develop their aerobic base?

The aerobic puzzle piece to your training plan does not, will not and cannot make your sprinter faster. It can, however, give them the stamina to summon up their speed-based training allowing them to run as fast as they can over and over again. With that in mind make sure their aerobic training does not dominate your sprint development training by putting your sprinters through heavy aerobic training cycles. You can have a training theme or cycle in which the aerobic component is the main emphasis but stay away from week after week of long slow running. This greatly inhibits the central nervous system's ability to fire forcefully and rapidly. But if you build your speed base requiring, in some cases velocities of 10 meters per second, on aerobic development reaching maximum velocities of only 5 meters per second, the chance for injury is likely. I mentioned earlier that speed will positively impact your aerobic capacity and the converse is not true.

4. How do you give them enough strength and power?

Notice I asked how you give them *ENOUGH* strength and power? It's not important for you to give them ***all you can***, but rather give them ***all they need***. Lifting as heavy as possible (limiting the volume of reps) will build great strength, avoiding hypertrophy, while lifting lighter weights with great speed develops power. This can be accomplished in the weight room or at the track. Short jumps, long jumps, sand runs, hills, stairs, or any type of resistance training that your athletes can handle. Be careful trying to fit the approach to the kids, rather make the approach fit the kids.

5. How many races do you expect them to run?

This training concern is one we all should be apprehensive about. We don't expect a young sprinter to run 60 races in a season, but it always happens to super-duper kids who can run 5 or 6 indoor meets with prelims (and semis) and finals. Then, if you're like California where you can have 5 or 6 league meets and 5 invitationals, coupled with league prelims, league finals, sectional prelims, sectional finals, Masters (State qualifier), topped off by a 2-day state meet. That could end up being well over 50 races. I will delve into this in greater detail in the coming pages,

6. How can you give them enough rest?

REST is not a "Four Letter Word" so coaches cannot be afraid to give your sprinters enough rest to recover from aggressive training cycles. Here's an example:

- A training day for a 60 flat 400-meter girl:
    - 2 x 3 x 200 meters in 28.0 with 2 mins rest in the first set – 15 minutes recovery between the sets and 30.0 with 2 mins rest in the second set.

The training day is not really what will make the biggest impact on the 400-girl's success. Workouts are violent and traumatize the body and actually tear it down, which is why some kids get sick after hard training cycles. It's during the time while resting that the body is forced to compensate for the stress it just had to endure. The body possesses what are called "Adaptive Reserves" which the body keeps for emergencies. These reserves can be called upon when the body faces an "uncommon" stress. The body recognizes the new level of fitness/sharpness as the new norm in response to another bout of stress. It's while the body is resting/recovering that it undergoes what we commonly refer to as Getting in Shape." So just because a kid can go hard all the time doesn't mean the

progress your hoping for is happening. If a kid needs another day to recover, don't keep hammering because that's what you have on paper.

Sprint training is a process of establishing a race model represents one of several key elements every sprint coach needs to know. Sprinting is a skill and you must perform skillful activities in your sprint program to make and keep your sprinters sharp. In addition, only by establishing your maximum velocity can you run at a percentage of that velocity at longer distances (that's what makes you a stronger sprinter). The race model becomes the road map to giving the sprinter a plan at practice, so the plan can be implemented on race day. More thoughts to consider:

a. The 100 meters is a "paced" race with splits like a 400. There's a certain amount of energy available during a short sprint race, and burning that fuel too early, or not being aggressive enough in the hopes of saving energy can result in poor race performances.

b. You must sprint with "patience" and "wait for" acceleration to finish, smooth transition to top end, and relaxed speed maintenance to the wire.

c. The middle 100 of the 200 meters is the fastest since it's a fly run.

d. The 2nd 100 of the 400 meters is the fastest since it's a fly run on the backstretch.

e. The middle 200 of the 400 meters (100 to 300 meters) is a "critical success zone" that if followed keeps your 400-meter sprinter from going to sleep on the backstretch or second turn.

f. A 30-meter fly test can give predictive "assistance" to the 100-200 & 400 meters by establishing a maximum velocity resulting in the longer distances being run at a percentage of that maximum. You can't run at a percentage of that speed if you don't know what it is.

g. You can get as strong as "you need" to be outside the weight room. Youngsters can get stronger using by teaching them to apply force properly using their body weight, correct posture, technique and relaxation.

h. Train your sprinter (don't just have workouts – you can do that at 24-hour fitness). A former sprinter told me he ran 15x150 meters one afternoon in 17-18 seconds with 5 minutes rest. Using this volume, intensity, and recovery, the

workout was doomed from the start. Volume (how much), intensity (how hard), recovery (how much rest between reps and sets), and density (how often) should be your guide for training your sprinter. Don't just copy workouts. Know why you do what you do so you can push them as hard as needed (not possible) and rest them to elicit a super compensative response.

i. Avoid these famous last words from the coach to the sprinter – *"Just Give Me One More"* – I have seen more injuries result from coaches needing their egos stroked by getting their kids to run that "competition" rep at practice. Now, it's ok to ask for efforts at practice that push the envelope, but do them for a reason, and not just so can trigger their "Gag" reflex! The volume of vomit on the track does not measure your worth as a coach.

"People are not *Afraid of Problems*, It's *Solutions* that Scare Them"

In the first part of this manual, I outlined methods for building the training regimens for both the long and short hurdles. I explained coaching the hurdler is a complex (multi-faceted) that need not be complicated (problematical). Brain surgery is a very complex operation, but if something goes wrong, the surgeon will say there were unforeseen complications. The complexity comes from taking all of the pieces of the sprint puzzle and laying them out in front of you before the season begins. This allows you to look at what the puzzle pieces fully assembled will look like before you get to the end. Don't wait until you get to the end of the year and evaluate your training approach by how fast or slow your kids run. If you have a plan in place, it becomes easier to make adjustments during the season rather being a passenger on a runaway workout train. As the season progresses, you can repeatedly refer to what you want your kid to look like, and if they are not making the progress you wanted, you can evaluate the training loads to determine if volume, density, intensity, and/or recovery need to be tweaked.

But if you never refer to your plan as the year rolls on, you can easily lose your way and begin to force incompatible training puzzle pieces into places they don't fit. Mixing and matching speed and speed endurance workouts, loading up on long slow stuff, doing block starts and finishing the day with a hard 350 because you wanted to make sure they left the track tired are not compatible. If your kids puke after a workout, often it has nothing to do with the workout but rather poor nutrition, sleep, or the onset of illness. Making a kid suffer because you feel suffering for suffering's sake builds character is not guarantee they will show up on Saturday. But getting them to "suffer well" so they can perform a quality 400 or in their 4th event of the day is definitely something you can plan and control.

Setting Up the Border

"Don't Waste the Negative"

My wife is an avid "puzzler" and loves to sit for hours conquering the 3000 to 5000-piece puzzles. But just as a "goof" I bought her a puzzle that did not have a border, and it darn near drove her to drink the hard stuff. She could not control the shape of the puzzle and her efforts were scattered and disjointed. But that is how some coaches approach their plans for their sprinters and hurdlers. But if I had given my wife a puzzle with a border, she would have found all the corners and straight edges to confine the final product. Then as she places each piece inside the border, the picture begins to show her what the final product should look like. As coaches we need to dump out the pieces of our season and find the corners and straight edges. That border represents the early development of maximal speed. As the season progresses and you fit piece by piece into the border (speed endurance, strength endurance, plyos, weight room, special endurance, and recovery) the kid you want them to be becomes clearer and clearer with every meet. So, let's dump out the pieces of your track season:

- How many weeks in the season?
- How many dual/scoring meets are there?
- How many invitationals are there?
- Is the athlete coming from another sport?
- How do I handle injuries besides praying?
- When is their biggest meet (league prelims, finals, regionals, state, Junior Olympics)?

Start from the last meet of your kid's year (AAU's or Junior Olympics), and count back to the first official day you can practice. You now know how many days will be available for you to practice, compete, and recover. For example, a typical high school track season can run from 13-16 weeks (Alaska has only 10-12 weeks to complete their track season) depending on when your area state federation calls the first day. Let's go with 14 weeks for this example. We will count back from the state meet as week #1 and the first week of practice will represent week #14. The following example will show meets, and race volumes to give you an idea of how the season can get away from you if you're not careful.

Week #1	100-200-4x100 State Prelims & Finals	6 races
Week #2	100-200-4x100 District Finals	3 races
Week #3	100-200-4x100 District Prelims	3 races
Week #4	100-200-4x100 League Prelims & Finals	5 races
Week #5	100-200-4x100 Invite & League Meet	6-8 races
Week #6	100-200-both relays	4 races
Week #7	100-200-both relays Invite & League Meet	8 races
Week #8	League Meet Bye & Invite 100-200	2 races
Week #9	400-both relays League Meet	3 races
Week #10	200-400-4x400 League Meet	3 races
Week #11	100-200-4x100 Invite & League Meet	6-8 races
Week #12	100-200-4x100 League Meet	3 races
Week #13	100-200-both relays Practice Meet	4 races
Week #14	1st Week of Practice	0 races
Total Races for 14 Weeks		56-60 races

That's a lot of races – no one sits down and PLANS to have their sprinter run this much, but the season can get away from you if you don't plan from the end and count back. There are 98 days in a 14-week track season and 18 days have been used for League Meets, Invitationals, League Prelims & Finals, District, and State. That leaves 80 days to figure out what to do next as far as programming your training cycles. Over a 14-week period, the rules that govern training stipulate your sprinter has no more than 2-3 anaerobic workouts per week (hard days). That means during those 14 weeks you should be able to plan 14-18 hard days (including meets) and 14 Sundays off to get them ready. That leaves 48 days to figure out what to do next. If you factor in another 20 days for rest and light recovery days, this leaves you 28 days to figure it out. So, you are left with 14 weeks to spread out your technical, medium to easy days, tempo running, start days, handoffs (these days can be hard also), and play/game days to freshen up the legs, and a surprise "go home" no practice days.

Week	M	T	W	TH	F	Sa	Sn	Hard Days
14	H	E	H	M	E	H	R	3
13	M	E	M	C	E	H	R	3
12	M	E	M	C	E	H	R	3
11	H	E	M	C	E	C	R	3
10	H	E	M	C	E	R	R	2
9	H	E	E	C	E	H	R	3
8	H	M	E	C	E	H	R	3
7	H	M	E	C	E	C	R	3
6	H	M	E	C	E	E/R	R	2
5	H	M	E	C	E	C	R	3
4	H	E	M	E	C	C	R	3
3	H	E	M	E	E	C	R	2
2	H	E	M	E	E	C	R	2
1	H	E	M	E	C	C	R	3

H	=	Hard Days
C	=	Competition Days
E	=	Easy Days
M	=	Medium Days
R	=	Rest Day (can be full or Active)

From this 98-day annual plan, you can see the following:

- 18 Hard workout days
- 18 Competition Days
- 32 Easy/Recovery Days
- 15 Medium Days
- 15 Rest Days

The number after each training week represents the number of hard workouts and/or meets the athlete had. For 11 of the 14 weeks, the sprinter ran hard 3 times each week. This is going to be a problem if the sprinter is engaged in multiple race, and/or multiple round contests. You're going to have one tired kid on your hands going into the biggest meets of the year (State or District) when you need them to be at their freshest.

The “puzzle” can be complex, but should not be complicated. Complexity is what brain surgery is while a Complication is something unforeseen by the surgeon. When you use the plan outlined here, you can look at the entire year and make decisions when to hammer and when to back off, so you can get them to the end ready to perform at their best. This plan will also allow you to anticipate potential injuries by noticing if the load of training and competition could be too much.

You’ll know why their hamstrings are a little sore and anticipate this by scheduling rest and recovery days and weeks, and even changing the plan a little by holding your kid out of a meet or two. Understand rest is one of the good four-letter words and you cannot hurt a kid when they are resting (or doing nothing). Don’t view rest as merely the prescription for illness or injury, but rather as a training component aiding in injury and illness prevention.

Now that your plan is laid out, it’s time for page two of your diabolical plan for sprint and hurdle world domination! How fast are the kids you’re training? How can you determine if the kid wanting to run the 100 is better suited for the 200, 400, or even the 800? One way to determine this is using the results of a 30-meter fly run. The Late Tony Wells was one of the more influential mentors in my coaching life and was arguably one of the brightest sprint minds this country has seen. At one time, Coach Wells’ athletes held every girl’s indoor sprint and hurdle youth record, while holding several outdoor sprint and hurdle standards as well. Coach Wells believed, as I do, the key to determining how fast a kid is comes from the results from the 30-meter fly run (using a 20 to 30-meter run-in zone). Once you acquire the time for the 30-meter fly, you can then run competition and longer distances at a percentage of the 30-meter fly maximum speed.

The first thing you need to do using the 30-meter fly test is maintain data collection consistency. If you have a speed trap, or can video the effort, you can maintain the accuracy of the data. But if you are not blessed to have a timing system and must resort to hand timing, stay with the hand timing for consistencies sake. So, on the test day, your male sprinter runs 2.92 (FAT) for the fly run. The first thing you need to do is subtract 0.12 from the automatic time to account for what is referred to as the “competition Factor.” This time reduction is to take the place of a competitive effort since the testing is done one kid at a time and they must run as fast as they can without the benefit of the race hype. Now we have an equation that looks like this:

30-meter fly = 2.92s
2.92s – 0.12 = 2.80s

30m/2.80s = 10.71 meters per second (velocity)

Take this velocity and divide in by 100 meters:

100m/10.71m/s = 9.34s

This does not mean your sprinter is now fast enough to break the world record in the 100 meters. Since the velocity was established from a fly time, the 9.34s run is the time for a fly 100-meters (like a 4x100 relay straight-away). Now add 1.00 second for acceleration, and 0.24 to account for FAT:

9.34s (fly 100m) + 1.24s = 10.58s

Now, a lot can go wrong during the race (poor start, cold temps, rain, or negative head winds), but the test can provide you with a concrete goal that relates to your sprinter's genetic potential. This means that you can formulate time based training around what a 10.58s 100-meter man needs to achieve in their training cycles. Using the 3rd hurdle of the women's 100-meter event and the 10th hurdle of the 400-meter hurdles, you can now time a competition fly 30-meters to see if the testing run can be duplicated in a meet.

Taking the projected 100-meter time of 10.58s, subtract 0.24 to remove the FAT from the time giving you a hand time:

10.58s – 0.24s (FAT) = 10.34s

Divide 100-meters by the 10.34s.

100/10.34 = 9.67m/s

Use the 9.67m/s and multiply that value by 98.3% which represents the new 200-meter velocity:

9.67m/s x 98.3% = 9.51m/s
200m/9.51m/s = 21.03s
21.03 + 0.24s (FAT) = 21.37

Take the 200-meter velocity (9.51m/s) and multiply it by 90% to achieve the 400-meter velocity:

9.51m/s x 90% = 8.56m/s
400-meters/8.56m/s = 46.73s
46.73s + 0.14s (FAT) = 46.87s

The reason why the added FAT time is only 0.14s is due to the start line of the race is the same as the finish line. Whereas the start lines of the 100 and 200-meter races are 100-meters plus, it takes a little longer to react to the smoke and sound of the starter's gun.

You can take this one more step for the 800-meters:

8.56m/s (400-meter velocity)
87.50 % = 800-meter velocity
8.56m/s x 87.50% = 7.49m/s
800m/7.49m/s = 106.80s (1:46.80s)

But the kid may not want to run the 800-meters, or even the 400-meters. But I try to show them how much farther (conference, district, state, USATF) they could go if they can commit themselves to training at the longer distance requirements. But as I have mentioned, this is all predicated on the maximum velocity. Let's look at athlete who follows a different path to get to their race potential. Neither the athlete or their coach takes speed training seriously until the end of the season because the coach believes early speed development will cause injuries or will cause an early peak the athlete will not be able to hold.

So, this sprinter spends their time running miles, long reps, breakdowns, and even suits up for cross country meets, the coach believes this type of work must be done to first ensure the sprinter has the strength to run the many races their season demands. This is not the case because to run longer reps faster, you must have already established a maximum velocity. But if the coach feeds the sprinter a steady diet of the same endurance-based training, there is very little improvement (the body will cease to improve when facing an accustomed stimulus). But the approach appears to work when the sprinter gets faster once the season starts. But speed is a skillful activity and running less than skillful reps cannot achieve the goal of true speed development.

Make no mistake as I have earlier indicated, aerobic development is good for the sprinter as outlined in the hurdle portion of this manual, but there is nothing about running slower than the event speed that can positively impact your ability to run faster. Speed positively impacts your endurance by making the longer reps at a percentage of your absolute speed feel easier or more manageable. But running slow cannot make you feel faster. And coaches who like to use the "S" word constantly refer to the endurance running making you "stronger". Running at 5 meters per second for 30 to 45 minutes only makes you adept at running 5 meters per second! How can running at 5 meters per second result in 10 meters per second? Even a high school girl running 600 meters in 1:45 (2:20 800 pace) at practice is still only running at 85% of the velocity needed to run 400 meters in 57 seconds. The longer this sprinter spends away from the specific race pace, the harder it becomes to develop comfort at 57 second rhythm following weeks and sometimes months of slower running.

If your girl can run 30-meters in 3.50 seconds (8.71m/s), it's 18% faster than the demands of a 57 400-meter sprint (7.01m/s). But if the fastest she runs at practice is at slower than 7-meters per second, how can she hope to meet the time demands (and where is the strength to run that fast coming from?)?

Let me put it this way: I have hired you to build a 2-story condo for me and I have given you the time and resources to complete the project in 6 months. But for the first 3 months you construct a single-story hacienda in the first 3 months, tear it down and then begin to construct my condo. Haven't you wasted 3 months building something you're going to have to tear down anyway? Then why build a middle-distance runner for several weeks or months using endurance reps and then expect the sprinter to miraculously appear by merely revving up the workouts?

The next several sections of the manual will give you race models, pace charts, practice organization, and workout menus to hopefully aid in your training plans. I hope this manual will serve your as you develop your young sprinters and hurdlers.

Compatible Training

“You Know What It Means, When You Know What It Means”

Compatible training for any sport requires like-minded cycles that complement each other. But never is the desire for like-minded training than in the sport of track and field and even more specifically in the arena of sprinting and hurdling. I cringe when I see sprinters and hurdlers running cross country, so the sprint coach can keep an eye on his kids or does not have the 5th kid so they can score in the league meets. In addition, the endurance-based coach believes the bleeding together of speed and endurance make the sprinter/hurdler ***stronger*** for their chosen event. But speed always positively impacts endurance, but the converse is not true. To establish the foundation of a speed **or** endurance-based program, there must be time for one or the other to be established first for that quality to be exploited.

To run speed development first (starts) and follow it up with some endurance work (repeat 200 or 300's) is counterproductive preventing the central nervous system from compensating for the sprint development stress. Some coaches often run endurance or even speed endurance workouts and follow them up with fly runs with the thought that this will force you to achieve speed development while in a state of advanced fatigue. Both of these approaches are flawed due to a misunderstanding of what speed is and how it is developed.

What's Compatible with Sprinting?

1. Endurance runs with strength endurance exercises that help develop general strength endurance.
2. Speed development runs with speed strength exercises
3. Speed development runs and exercises with explosive dynamic strength development exercises (ex: short jumps)
4. Speed development runs with movement coordination exercises (starts, finishing drills, and/or sprint specific drills).

Notice the above training exercises all exist in an environment of like-minded training. Notice, "endurance with general endurance" and "speed development with explosive dynamic" exercises. You don't see general strength and explosive dynamic exercises, or speed development runs with endurance runs. Be consistent and be specific!

What's Incompatible with Sprinting?

1. Speed development with any type of endurance runs over 80 meters. Once you pass 7 seconds of sprint effort, you now begin to operate in an endurance capacity.
2. Speed development with strength endurance activities.
3. Speed development with strength development exercises.
4. Strength development (maximal strength methods) exercises with any type of endurance runs.
5. Exercise complexes for the development of coordination (highly skillful) with strength development exercises.

The greatest service you can provide your sprint or hurdle kid is to make sure the training you are programming for them has a foundation of specificity, consistency, and individuality.

Compatibility Run Amuck!

The following is a training day for a group categorized as short (100-200) and long (200-400) sprinters right from a coach's log:

Speed session #1 - ***Key Goal is Acceleration***

3x10, 3x20, 3x30, 3x40 meter accelerations with 2-2-3-4 mins recovery between the reps and 6 mins between the sets. The short (100-200) sprinters went to the weight room for an acceleration-based lift session.

So far so good…….

But THEN!

The long sprinters stayed at the track and completed the following:

2x150's at 95% with 6 mins then 15 mins

Followed by 1x320 at 95%

Then the weight room

This was not a compatible training day if Acceleration was the GOAL. Just because they are long sprinters does not demand 2x150's and 1x320 simply because they run the 200-400. They are sprinters and should have been treated as such. A recovery day or two followed by 2x150's and a 320 could have been really exciting.

Sprint Race Modeling

The sprints and hurdle races have models that must be replicated at practice to make race execution on meet day easier for the athlete to produce. Not having a race plan is like going to a gun fight with a feather duster. You are ill-prepared for what you've gotten yourself into. A race model is a pattern you practice so on race day your mind and body are prepared for the rigors of the competition. I was always taught as an athlete you must **plan the race** during the week, so you can **race the plan** on the weekend. Every sprint race has a map or blueprint for success. That doesn't mean you'll win every race, but if you follow your plan, it will create in your sprinter/hurdler a routine that will produce more consistent competitive efforts.

In the hurdle section of the manual, I included race pace charts to give the coach an outline of what a long or short hurdle race requires from your kid. The speed between the hurdles is given so you can run your kids at the pace of the time you wish to run on meet day. In this section, race models for the 100, 200, and 400 meters will be outlined so you can speed your time doing thing specific to the race demands of each event. Each race on the track, whether it's a sprint on the track or a marathon on the roads has a critical zone that determines success or failure. The word "critical" is defined as *of decisive importance with respect to outcome*. The word "zone" is defined as *an area having a particular characteristic, purpose, or use.* If you're going to exploit the critical zones of the sprint and hurdle events, you must *dominate* the portion of the race that is of decisive importance and results in the desired outcome (Gold Medal or first place). The 100-meters has 4 training zones, the 200-meters has 4 training zones, while the 400-meters has 6 training zones. But since the last 25% of every race is where the medals are decided tells you all 3 sprint races have one critical or WIN ZONE. Managing each of the early race zones gives you a fighting chance to execute the win zone. If you go out too slow, too fast, run the turns too soft or with too much aggression, it takes you out of the hunt when you arrive at the critical zone (or the last 25%). If you execute a well-balanced, well-paced run in the early stages of the 100, 200, and 400-meters, you give yourself a level playing field to win the race.

100-Meter Race Modeling

I mentioned at the beginning of the sprint section that even the 100-meters is a "paced" race. It's not like a distance event where you run a certain pace and then kick home. There is no kick in the 100 meters even though when a sprinter pulls away from the field it appears, they are running faster. The 100-meters is a neural race where the energy expended must be portioned out judiciously but has nothing to do with even distribution. There are certain energy systems that you plug into as your run from one zone of the sprint and bleed into the next. The 100-meters utilizes available ATP in the initial start covering the first step out of the blocks. This is followed by a shift into the Alactic/Creatine Phosphate system up to 5 seconds. Before I go any further, I need to explain the energy systems being used are not represented by faucets that turn on and then off when they are exhausted (allowing the body to switch on the next faucet). The body's energy supplies are all on and available at the same time, but are initiated by the speed, power and time frame being supported by the sprint. Even though ATP is the dominant energy being used at the initial start, the phosphate system is on as well and bleeds into the run as the dominant resource once the ATP is drained. After 5 seconds of effort the Alactic/CP system shifts to CP only as you begin to approach the speed endurance zone (represented by time frames of more than 7 seconds). To take advantage these shifts in neural resources, the 4 zones I mentioned earlier must be coached using a variety of training items that concentrate on the race time frames. The following information outlines some of the items that are critical to each part of the sprint/hurdle race. I am not saying you have to do everything I am going to list, but you must come up with a plan resulting in an explosive acceleration. The 4 100-meter zones are:

- 0 to 30-meters
- 30 to 60-meters
- 60 to 80-meters
- 80 to 100-meters

The 0 to 30-meter Zone is Represented by:

1. **Cueing**: When you ask a young sprint what they think about when they hear the gun in the 100, they usually say, I think about "getting out" as fast as I can. But what does that mean? Instead of trying to anticipate the starter's gun trying to get a blazing start (running the risk of guessing wrong and being DQ'd, or being caught off guard because you guessed wrong), we need to help them execute movements that result from the sound of the gun. The sprinter has 2 hands and 2 feet that propel them from the block. Instead of just trying to get out, focus on one of the 4 to facilitate a great start. If you have your sprinter choose to push violently off the front block pedal, or popping the back foot off the block pedal, or fire the lead hand forcefully upward into the shoulder, or throwing the back arm behind you into the shoulder, you give them one thing to think about in response to the gun. If I push violently off the front block, I give my arms time to hit while having time to drive the back thigh forward. Since the gun is a foregone conclusion, why worry about trying to beat it? What should be of greater concern is how will you react when you hear the gun. Giving your sprinter a cue, which sharpens their focus and makes them ready for the gun is what your early block days should concentrate on.
2. **Acceleration Drills and Step Drills**: Develop a pattern using a tape on the track to help your sprinter feel that their stride will gradually get longer and longer as they move deeper into the first 15-30 meters. Avoid the initial acceleration at practice a race to the 10-20 or 30-meter line. If they race at practice, they are practicing a pattern that won't survive when they must run 100 or 200 meters. Focus their attention on ability to run through their gears.
3. **"S-H" Drills**: My mentor, the late Dr. Bert Lyle told me many years ago about the "S-H" drills which were made up of sleds, sand, stairs, hills and harness work. Make sure if you do any resistance runs, like the ones mentioned, you stay within the time frame that constitutes the acceleration zone (out to 6-7 seconds). In addition, make sure the resistance does not exceed 10% of their body weight (15% for mature sprinters). If the weight goes beyond these numbers, posture and force production changes and does not mimic the actual effort sought. Using the contrast method with the S-H drills, run 2 reps with the resistance and follow it with one

run without. The resistance forces the body to summon up its adaptive reserves, and results in super compensation.

4. **Weight Room**: Olympic lifts are a major contributor to the acceleration speed and power you seek in your sprinter. Power cleans (from the floor, the knees and pulls), snatch, dead lifts, jump squats, heavy step ups (1-3x body weight onto a 4inch box). If you are working with middle school, and high school age sprinters and hurdlers, their relative experience in the weight room could be nonexistent. But you can still use broom sticks, PVC sticks, and dumbbells which will enable them to progress to the bar with experience.

5. **Short Jumps**: Short jumps incorporate efforts like standing long jump, 3 bound, and 5 bound which mimic the acceleration mechanics. Hurdle hops, box jumps, and squat jumps at the track using medicine balls help not only to make you stronger but increases skill and coordination.

6. **Distance Between the Knees**: This sprint ability is extraordinarily important to acceleration skill development. Each time you take a step, the knee of the opposite leg must line up next to the support knee. If you can seek daylight between the knees as you accelerate, it is a clue that the sprint/hurdler is not using the power and force generated from the hips. Sprinters and hurdlers run "ON" your feet, but not "WITH" your feet. You must run "WITH" your hips! A car drives on its wheels, but with the engine that generates the force and power that becomes translated to the wheels. Short jump routines, lunging, single leg squats and step ups are a few things can reduce the distance between the knees during each stage of the sprint.

The 30 to 60-meter Zone is Represented by:

1. **Transition Drills:** The word "Transition" is the process of changing from one state or condition to another. It's clear all sprint and hurdle races must transition from zero through an acceleration pattern to top speed to speed maintenance and finally to race finish. The 100 meters for example is a series of positive and negative accelerations from start to finish incorporating numerous transitions. Train various transitions at practice so your sprinter can adapt to the changes in driving to top speed and carrying it to the finish. Fly runs, and ins and outs train how your sprinter should run after they finish their acceleration. Part-part-whole training is important, especially for younger sprinters when teaching how to move from acceleration to top end speed. Acceleration is a powerful collaboration of driving steps (acceleration) transitioning to quicker steps (top speed) when you no longer need to push. But Younger sprinters get anxious and want to get out "before God got the news." So, they use quick (top speed) steps at the beginning of their race, only to find out they have tapped their energy for the final stages of the race. And when they feel fried in the last 30 meters, the tendency is to dig deep and they default to big arms and hard step which are acceleration mechanics.
2. **Stable stride mechanics:** From 30 to 60 meters, stride length should remain constant, so running 10 to 20-meter fly zones at practice with a choreographed stride pattern is most helpful. The stride should be something a little shorter than what you really want in the race, so you can keep them relaxed and you can run more reps.
3. **Assisted Runs:** Downhill runs are preferred over towing because younger and inexperienced sprinters tend to over stride or lean back due to a fear of falling. Most young people can run with the wind or run down a gradual slope under control and with confidence. You may be able to tow them faster, but the braking that goes with it is more harmful. Towing kids of different heights and weight can be overcome letting them run on their own with the wind or downhill.
4. **Speed Bounds:** Help generate high ground forces in short time frames, similar to absolute speed mechanics which is the goal for running through this zone of the 100.

5. **Technical Cueing:** Your sprinter needs to "feel what you know" so providing the necessary verbal cues during the technical effort aids in the learning curve.

The 60 to 80-meter Zone is Represented by:

1. **Stride Length & Stride Rate Changes:** In this phase of training, the sprinter must learn to resist the urge to open their stride as fatigue sets in. The desire to push harder against the track late in the race causes longer ground contacts which causes, you to slow down and stride frequency goes down (frequency needs to be protected at all coast here). Ins and Out runs working on changing gears and keeping the frequency the main thing. Maintenance of these two factors must remain as close to the 30-60-meter zone length and rate as possible.
2. **Strength Endurance Run:** Runs that are categorized as no fewer than 9 reps, 90 meters, or 9 seconds of effort. These reps are run at 90% with a 10-15% load so you can bleed strength and power together at the same time. Hills have been found to be an excellent choice when running strength endurance reps.

The 80 to 100-meter Zone is Represented by:

1. Medals are decided here when you have 5 or 6 sprinters vying for 3 medals. Keeping the step length and rate constant requires great focus and confidence in your training. Holding velocity and stride length integrity comes from repeated technical cueing. When it gets hot in the last 20-meters, and you try to catch someone or fight them off, the tendency is to dig in and try to power your way out of trouble. But this effort yields the opposite result. "Digging In" forces you back into an acceleration technique that requires longer ground times, which goes against top speed mechanics. The longer ground times causes braking the sprinter doesn't even feel because they are convinced the push at the end feels good and powerful. You cannot go any faster so ins and outs (also called "sprint-float-sprint"), running on tape at 5-10% less than your tops speed stride to feel the turnover. Holding sugar or sand in your hands while running ins and outs and letting the sand or sugar leak slowly from your hands on the aggressive IN and

tighten your hands on the OUT. This teaches you how loosen your hands, arms, neck, shoulder, etc. staying relaxed when you're in a dog fight to the wire.

200-meter Race Modeling

0 to 50-meters

Cuing from the blocks
Just as fast as 100-meter 1st 50
100-meter acceleration work
3-5-10-meter bounds for power
"S-H" Drills
0 to 30-meter 100m model runs

50 to 90-meters

Float fast/carry acceleration speed
right arm swing to midline (sternum)
feet track the turn like a monorail
fly runs and ins & outs
60 to 80-meter 100 modeling
float fast here – speed up the hands

90 to 120-meters

Use the 4x1 relays zone to cue faster
Builds off the turn to the wire
Strength endurance runs
Run downhill off the turn

120 to 200-meters

guts & glory run with big frequency
Inertia runs floating fast when tired
strength endurance runs
run on tape to hold step rate

Possible 200-meter Race Plan

0 to 50-meters	Big hands (see your hands) – push phase through the to the middle of the turn – This is your "IN" zone
50 to 90-meters	Carry phase #1 – smooth but fast running around the turn – "jelly out" the arms and maintain what you generated in the first 50-meters. This is your "OUT" zone
90 to 120-meters	Rev up the frequency (move the hands in a little drumbeat) and using the 4x100 relay acceleration zones to cue this gear change – This is another "IN" portion
120 to 200-meters	Carry phase #2 – Think "Hot Track" using quick draw movements with the hands – and above all, Float Fast! No long arm movements event if they are closing or catch you. Frequency in a state of fatigue is all you have left. Guts and Glory, Mom, Apple Pie and the Flag!

At practice, training the 0-50, 50-90, and 90-120-meters work the alactic zones for workout modeling. This area depends a great deal on power as the dominant system along with speed endurance. Starts, turn runs 30 through 120 meters at near or maximal efforts with full recovery (depending on the age of the athlete you can use 3 to 15 reps). Training 120-meters to the finish requires low phosphate work. Power, capacity and fast tolerance workouts are critical here (and they hurt).

Possible 400-meter Race Plan

0 to 50-meters	See your hands just like the 200-meters
50 to 150-meters	Cary phase #1 – Float fast out of the turn and into the back stretch – Sing your favorite song in your head – fastest 100-meter split
150 to 200-meters	Get the arms ready for a change in swing effort – running through the relay zones to trigger this change in rhythm
200 to 250-meters	Run into the turn with aggressive arms then float the arms and maintain – You can't take a blow here
250 to 310-meters	Get ready to run downhill starting with the 4x100 relay zone at 280-meters – quicker arm tempo coming off the turn
310 to 400-meters	Relaxed fast running maintaining your frequency and fighting the urge to go to a big "Base Drum" arm swing (you should not be able to see your hands!) – Frequency is the Key here and run for "A.Y.H.N.A.D." (All You Hold Near And Dear).

At practice, up to 200-meters, training can mimic the 200-meter event. Running workouts that prepare the lactate system for swimming in the junk, so you can tolerate the physical and metal toll. Capacity and tolerance runs can extend out to 600 meters, but if you're going to test this zone, run it all out, one time. A 50-sec. boy or a 58-sec. girl would both benefit more from 1x600 in 1:22-23 and 1:37 respectively than 4x600 in 1:40/1:55 because of the speed demand for a time period passed their race time. In addition, the slower 600's may negatively impact their sprint mechanics.

The 400-meter race model times that I have included was taken from a pace chart I was given by Dennis Shavers, Director of Men and Women's Track & Field at

LSU. The times here are just a “model” and some young people and their race models will different from this chart while other will be spot on. But it does give you a starting point, which is all some of us need to get the job done.

Time	1st 200	2nd 200	300	1st 100	2nd 100	3rd 100	4th 100
47.20	22.60	24.60	34.65	11.53	11.07	12.05	12.55
47.60	22.80	24.80	34.95	11.63	11.17	12.15	12.65
48.00	23.00	25.00	35.25	11.73	11.27	12.25	12.75
48.40	23.20	25.20	35.55	11.83	11.37	12.35	12.85
48.80	23.40	25.40	35.85	11.93	11.47	12.45	12.95
49.20	23.60	25.60	36.14	12.04	11.56	12.54	13.06
49.60	23.80	25.80	36.44	12.14	11.66	12.64	13.16
50.00	24.00	26.00	36.74	12.24	11.76	12.74	13.26
50.40	24.20	26.20	37.04	12.34	11.86	12.84	13.36
50.80	24.40	26.40	37.34	12.44	11.96	12.94	13.46
51.20	24.60	26.60	37.63	12.55	12.05	13.03	13.57
51.60	24.80	26.80	37.93	12.65	12.15	13.13	13.67
52.00	25.00	27.00	38.23	12.75	12.25	13.23	13.77
52.40	25.20	27.20	38.53	12.85	12.35	13.33	13.87
52.80	25.40	27.40	38.83	12.95	12.45	13.43	13.97
53.20	25.60	27.60	39.12	13.06	12.54	13.52	14.08
53.60	25.80	27.80	39.42	13.16	12.64	13.62	14.18
54.00	26.00	28.00	39.72	13.26	12.74	13.72	14.28
54.40	26.20	28.20	40.02	13.36	12.84	13.82	14.38
54.80	26.40	28.40	40.32	13.46	12.94	13.92	14.48

55.20	26.60	28.60	40.62	13.56	13.04	14.02	14.58
55.60	26.80	28.80	40.92	13.66	13.14	14.12	14.68
56.00	27.00	29.00	41.22	13.76	13.24	14.22	14.78
56.40	27.20	29.20	41.52	13.86	13.34	14.32	14.88
56.80	27.40	29.40	41.82	13.96	13.44	14.42	14.98
57.20	27.60	29.60	42.12	14.06	13.54	14.52	15.08
57.60	27.80	29.80	42.42	14.16	13.64	14.62	15.18
58.00	28.00	30.00	42.72	14.26	13.74	14.72	15.28
58.40	28.20	30.20	43.02	14.36	13.84	14.82	15.38
58.80	28.40	30.40	43.32	14.46	13.94	14.92	15.48
59.20	28.60	30.60	43.62	14.56	14.04	15.02	15.58
59.60	28.80	30.80	43.92	14.66	14.14	15.12	15.68
60.00	29.00	31.00	44.22	14.76	14.24	15.22	15.78

Training That Works

If you want to give your kids workouts, they don’t need you. Just send them to the gym so they can get sweaty. But as a sprint coach, you need to make sure the workouts you design fulfill the specific needs of the event and the time frame you’re trying to get your young people to master (and transfer to the meet day).

Sprint Development

Terminology	Runs	% of Effort	Sets/reps Recovery	volume 100-200	volume 200-400
Absolute speed	20-80m	90-95	3-5/6-8m	300-800m	300-900m
Speed End.	80-150m	90-95	5-6/6-10m	300-800m	400-1000m
Special End. I	150-300m	90-95	10-12m	600-900m	600-1200m
Special End II	300-600m	90-95	15-20m	300-600m	900-1200m
Inten. Tempo	100-600m	80-89	30s/5m	800-1800m	1000-2800m
Ext. Tempo	200-800m	40-75	45s/2m	1400-2500m	2400-4000m

Suggested Block Positioning for Different Leg Lengths

Trochanter Length Centimeters	Position of front Block from the Starting line	Distance Between the Blocks
63.5	35.5	26.6
66.0	36.9	27.7
68.5	38.3	28.7
71.1	39.8	29.8
73.6	41.2	31.0
76.2	42.6	32.0
78.7	44.0	33.0
81.2	45.4	34.1
83.8	46.9	35.1
86.3	48.3	36.2
88.9	49.7	37.3
91.4	51.1	38.3
93.9	52.5	39.4
96.4	54.0	40.5
99.0	55.4	41.5
101.0	57.9	42.4

Men's 100-meter Calculator*

10-meter zones	10.60	10.70	10.80	11.00
10m	2.02	2.04	2.06	2.10
Split	2.02	2.04	2.06	2.10
20m	3.10	3.13	3.16	3.22
Split	1.08	1.09	1.10	1.12
30m	4.08	4.12	4.16	4.24
Split	0.98	0.99	1.00	1.02
40m	5.02	5.07	5.11	5.21
Split	0.94	0.95	0.95	0.97
50m	5.95	6.00	6.06	6.17
Split	0.93	0.93	0.94	0.96
60m	6.86	6.93	6.99	7.12
Split	0.92	0.93	0.93	0.95
70m	7.79	7.86	7.94	8.08
Split	0.93	0.93	0.94	0.96
80m	8.71	8.80	8.88	9.04
Split	0.93	0.94	0.94	0.96
90m	9.65	9.74	9.83	10.02
Split	0.94	0.94	0.95	0.97
100m	10.60	10.70	10.80	11.00
Split	0.95	0.96	0.97	0.98

*These are not exact but can be used for a more consistent start session.

Women's 100-meter Calculator*

10-meter zones	11.80	12.00	12.20	12.40
10m	2.25	2.29	2.32	2.36
Split	2.25	2.29	2.32	2.36
20m	3.45	3.51	3.57	3.63
Split	1.21	1.23	1.25	1.27
30m	4.54	4.62	4.70	4.77
Split	1.09	1.11	1.13	1.14
40m	5.59	5.68	5.78	5.87
Split	1.04	1.06	1.08	1.10
50m	6.62	6.73	6.84	6.95
Split	1.03	1.05	1.07	1.08
60m	7.64	7.77	7.90	8.03
Split	1.02	1.04	1.05	1.07
70m	8.67	8.82	8.96	9.11
Split	1.03	1.05	1.07	1.08
80m	9.70	9.87	10.03	10.19
Split	1.03	1.05	1.07	1.08
90m	10.74	10.93	11.11	11.29
Split	1.04	1.06	1.08	1.10
100m	11.80	12.00	12.20	12.40
Split	0.95	0.96	0.97	1.11

*These are not exact but can be used for a more consistent start session.

Women's 200-meter Calculator*

50-meter zone	24.50	25.00	25.50	26.00
50m	6.88	7.03	7.18	7.32
Split	6.88	7.03	7.18	7.32
100m	12.68	12.97	13.23	13.49
Split	5.80	5.94	6.05	6.17
150m	18.35	18.91	19.28	19.66
Split	5.80	5.94	6.05	6.17
200m	24.50	25.00	25.50	26.00
Split	6.02	6.09	6.22	6.34
1st 100m	12.68	12.97	13.23	13.49
Middle 100m	11.60	11.88	12.10	12.34
Last 100m	11.82	12.03	12.27	12.51
1st 150m	18.35	18.91	19.28	19.66
Last 150m	17.62	17.97	18.32	18.68

*These are not exact but can be used for a consistent modeling session.

Men's 200-meter Calculator*

50-meter zones	21.50	22.00	22.50	23.00
50m	6.05	6.19	6.34	6.47
Split	6.05	6.19	6.34	6.47
100m	11.16	11.42	11.68	11.92
Split	5.11	5.23	5.34	5.45
150m	16.27	16.65	17.02	17.37
Split	5.11	5.23	5.34	5.45
200m	21.50	22.00	22.50	23.00
Split	5.23	5.35	5.48	5.63
1st 100m	11.16	11.42	11.68	11.92
Middle 100m	10.22	10.46	10.68	10.90
Last 100m	10.34	10.58	10.82	11.08
1st 150m	16.27	16.65	17.02	17.37
Last 150m	15.45	15.81	16.16	16.53

*These are not exact but can be used for a consistent modeling session.

Men's 400-meter Calculator

100-meter zones	47.00	48.00	49.00	50.00
100m	11.63	11.88	12.13	12.38
Split	11.63	11.88	12.13	12.38
200m	22.43	22.89	23.37	23.86
Split	10.80	11.01	11.24	11.48
300m	33.93	34.64	35.36	36.11
Split	11.50	11.75	11.99	12.25
400m	47.00	48.00	49.00	50.00
Split	13.07	13.36	13.64	13.89
1st 200m	22.43	22.89	23.37	23.86
2nd 200m	24.57	25.11	25.63	26.14
200m Differential*	**2.14**	**2.22**	**2.26**	**2.28**

**200m differentials for 400m sprinters should be right around 2.0 seconds but can vary as low as 1.5 and as high as 3.0 seconds depending on the speed, speed endurance, and if the sprinter runs a sold model. When we see our 400 sprinters fall apart in the last 100 meters, we tend to pound the endurance work to make them stronger/tougher at the end. But this problem will continue to happen if they run too slow the first 100m, or they take a blow on the second turn causing them to run off the turn like crazy, but don't have the energy for such an aggressive attack.

Women's 400-meter Calculator

100-meter zones	56.00	57.00	58.00	59.00
100m	13.72	13.94	14.21	14.45
Split	13.72	13.94	14.21	14.45
200m	26.75	27.19	27.71	28.18
Split	13.03	13.25	13.50	13.73
300m	40.76	41.43	42.23	42.94
Split	14.01	14.24	14.52	14.76
400m	56.00	57.00	58.00	59.00
Split	15.24	15.57	15.77	16.06
1st 200m	26.75	27.19	27.71	28.18
2nd 200m	29.25	29.81	30.29	30.82
200m Differential*	**2.50**	**2.62**	**2.58**	**2.64**

**200m differentials for 400m sprinters should be right around 2.0 seconds but can vary as low as 1.5 and as high as 4.0 seconds depending on the speed, speed endurance, and if the sprinter runs a sold model. When we see our 400 sprinters fall apart in the last 100 meters, we tend to pound the endurance work to make them stronger/tougher at the end. But this problem will continue to happen if they run too slow the first 100m, or they take a blow on the second turn causing them to run off the turn like crazy, but don't have the energy for such an aggressive attack.

Training Volumes for the 200 & 400-meters
(Percentages Based on the Purdy Tables)

70-75% Effort (2000-4000m) about 30 sec to 4 min between

Examples:
a. 1-2 x 10 x 200m (2 mins / 6-8 mins)
b. 1-2 x 15 x 100m (60 sec / 6-8 mins)
c. 8-10 x 300m (3 mins)
d. 500m, 400m, 300m, 400m, 500m (3-4 mins)

80% Effort (1600-2000m) about 6-7 mins between (5-6 mins for 100-250 reps)

Examples:
a. 4-5 x 400m (6 mins)
b. 5-6 x 300m (6 mins)
c. 8-10 x 200m (6 mins)

about 1200-1600m for shorter stuff due to velocities being higher

Examples:
a. 6-8 x 200m (5-6 mins)
b. 5 x 250m (6 mins)
c. 2 x 250m, 2 x 200m, 2 x 150m (6 mins)

85% Effort (900-1200m) 12 min breaks, but it's better to work down to 10 min

a. 2 x 450m (12 mins)
b. 400m, 300m, 200m (12 mins)
c. 2 x 450m, 1 x 300m (12 mins)
d. 3 x 300m, 1 x 150m (12 mins)

90% Effort (600-900m) 15 – 20 mins or 108-110 heart rate

Examples:
a. 400m, 300m, 200m
b. 350m, 250m, 150m
c. 2 x 250m, 1 x 150m
d. 300m, 150m, 2 x 80m

95% Effort (200-1000m) Ready recovery or whatever it takes to hit the task

Examples:

a. 450m, 200m

b. 350m, 200m

c. 250m, 200m, 150m

d. 300m, 3 x 80m

e. 150m, 120m, 2-3 x 90m

PACE CHARTS

The following pace charts were modified without sets, reps, and recovery to allow coaches to set up their own training plans and establish how much and how often their young people can stress the systems talked about in earlier chapters. As I have said concerning all of the “so-called” calculators, they are a merely a framework from which to operate. You may fall short of these goal sheets for a myriad of reasons, or you may exceed them. Do not depend on them solely to determine your own skill as a coach or their talent as sprinters and hurdlers. Rather, use them in collaboration with what you know (both intellectuality and from your gut), and what your kids bring to the table (from Mom and Dad’s gene pool).

Goals: 12.34/25.1/55.8/2:07.6

%	150m.	200m.	250m.	300m.	350m	400m.	450m.	500m
95%	19.2	25.8	32.5	41.9	50.8	60.2	69.9	1:20.0
92.5%	19.7	26.6	34.3	43.0	52.2	61.8	71.8	1:22.2
90%	20.2	27.3	35.3	44.2	53.6	63.5	73.8	1:24.5
87.5%	20.8	28.1	36.3	45.4	55.1	65.1	75.9	1:26.9
85%	21.4	28.9	37.3	46.7	56.8	67.2	78.1	1:29.3
82.5%	22.0	29.7	38.4	48.1	58.5	69.1	80.4	1:32.1
80%	22.7	30.7	39.6	49.6	60.3	71.3	82.9	1:34.9
77.5%	23.4	31.6	40.9	51.2	62.2	73.6	85.6	1:38.2
75%	24.1	32.7	42.2	52.9	64.2	76.1	88.4	1:41.2
72.5%	24.9	33.8	43.7	54.7	66.4	78.7	91.4	1:44.7
70%	25.8	34.9	45.1	56.6	68.8	81.5	94.7	1:48.4

Goals: 12.15/24.7/54.9/2:05.6

%	150m.	200m.	250m.	300m.	350m	400m.	450m.	500m
95%	18.9	25.5	32.8	41.1	49.9	59.1	68.6	1:18.5
92.5%	19.4	26.2	33.8	42.2	51.3	60.7	70.5	1:20.6
90%	19.9	26.9	34.7	43.4	52.7	62.3	72.4	1:22.9
87.5%	20.5	27.6	35.7	44.6	54.2	64.1	74.5	1:25.2
85%	21.0	28.4	36.7	45.9	55.7	65.9	76.6	1:27.7
82.5%	21.7	29.3	37.8	47.3	57.4	67.9	78.9	1:30.4
80%	22.3	30.2	39.0	48.8	59.2	70.1	81.4	1:33.1
77.5%	23.0.	31.1.	40.2	50.3	61.1	72.3	84.0	1:36.1
75%	23.8	32.1.	41.5	52.0	63.1	74.7	86.8	1:39.3
72.5%	24.6	33.2	42.9	53.7	65.2	77.2	89.7	1:42.7
70%	25.4	34.4	44.4	55.6	67.6	80.0	92.9	1:46.4

Goals: 11.96/24.3/54.05/2:03.6

%	150m.	200m.	250m.	300m.	350m	400m.	450m.	500m
95%	18.6	25.1	31.8	40.5	49.1	58.0	67.4	1:17.2
92.5%	19.1	25.8	33.2	41.5	50.4	59.6	69.4	1:19.2
90%	19.6	26.5	34.1	42.7	51.8	61.2	71.1	1:21.3
87.5%	20.1	27.2	35.1	43.9	53.2	63.0	73.1	1:23.6
85%	20.7	28.0	36.1	45.1	54.8	64.8	75.2	1:26.1
82.5%	21.3	28.8	37.2	46.5	56.4	66.7	77.5	1:28.7
80%	22.0	29.7	38.3	47.9	58.2	68.8	79.9	1:31.4
77.5%	22.7	30.6	39.5	49.5	60.0	71.0	82.5	1:34.4
75%	23.4	31.6	40.8	51.1	62.0	73.3	85.0	1:37.5
72.5%	24.2	32.7	42.2	52.8	64.1	75.8	88.1	1:40.8
70%	25.0	33.8	43.7	54.7	66.4	78.5	91.2	1:44.4

Goals: 11.70/23.80/52.9/2:00.8

%	150m.	200m.	250m.	300m.	350m	400m.	450m.	500m
95%	18.3	24.7	31.4	39.8	48.2	57.0	66.2	1:15.6
92.5%	18.8	25.4	32.7	40.8	49.6	58.5.	68.0	1:17.7
90%	19.3	26.0	33.6	42.0	50.9	60.2	69.8	1:19.9
87.5%	19.8	26.8	34.5	43.1	52.3	61.9	71.8	1:22.1
85%	20.4	27.5	35.5	44.4	53.8	63.7	73.9	1:24.5
82.5%	21.0	28.4	36.6	45.7	55.5	65.6	76.1	1:27.1
80%	21.6	29.2	37.7	47.1	57.2	67.6	78.5	1:29.8
77.5%	22.3	30.1	39.9	48.6	59.0	69.8	81.0	1:32.6
75%	23.0	31.1	41.5	50.2	60.9	72.1	83.7	1:35.7
72.5%	23.8	32.2	43.0	52.0	63.0	74.5	86.5	1:39.0
70%	24.6	33.3	44.6	53.6	65.3	77.2	89.6	1:42.5

Goals: 11.60/23.6/52.5/1:59.9

%	150m.	200m.	250m.	300m.	350m	400m.	450m.	500m
95%	18.0	24.3	31.3	39.1	47.4	56.0	69.0	1:14.3
92.5%	18.5	25.0	32.3	40.2	48.7	57.5	66.8	1:16.3
90%	19.0	25.6	33.1	41.3	50.0	59.1	68.8	1:18.4
87.5%	19.5	26.4	34.0	42.4	51.4	60.8	70.5	1:20.7
85%	20.1	27.1	35.0	43.7	52.7	62.6	72.6	1:23.0
82.5%	20.7	27.9	36.0	45.0	54.5	64.4	74.8	1:25.5
80%	21.3	28.8	37.1	46.4	56.2	66.4	77.1	1:28.2
77.5%	22.0	29.7	38.3	47.8	58.0	68.6	79.6	1:31.0
75%	22.7	30.7	39.5	49.4	59.9	70.8	83.2	1:34.0
72.5%	23.5	31.7	40.8	51.1	62.0	73.2	85.0	1:37.2
70%	24.3	32.8	42.3	52.9	64.2	75.8	88.0	1:40.7

Goals: 11.43/23.3/51.8/1:58.3

%	150m.	200m.	250m.	300m.	350m	400m.	450m.	500m
95%	17.8	24.0	30.9	38.5	46.6	55.1	63.9	1:13.0
92.5%	18.3	24.6	31.7	39.5	47.9	56.6	65.6	1:15.0
90%	18.7	25.3	32.4	40.6	49.2	58.1	67.4	1:17.1
87.5%	19.3	26.0	33.5	41.8	50.6	59.8	69.3	1:19.2
85%	19.8	26.7	34.4	43.0	52.1	61.5	71.4	1:21.6
82.5%	20.4	27.5	36.5	44.3	53.6	63.4	73.5	1:24.0
80%	21.0	28.3	37.7	45.6	55.3	65.3	75.8	1:26.6
77.5%	21.7	29.2	38.9	47.1	57.0	67.4	78.2	1:29.4
75%	22.4	30.2	40.1	48.6	58.9	69.6	80.8	1:32.4
72.5%	23.1	31.2	41.7	50.3	60.9	72.0	83.5	1:35.5
70%	23.9	32.3	43.2	52.1	63.1	74.7	86.5	1:38.9

Goals: 11.27/22.9/50.90/1:56.3

%	150m.	200m.	250m.	300m.	350m	400m.	450m.	500m
95%	16.9	23.0	29.8	37.3	45.3	53.7	62.2	1:11.2
92.5%	17.4	23.6	30.6	38.3	46.5	55.0	63.9	1:13.1
90%	17.9	24.3	31.4	39.4	47.8	56.6	65.7	1:15.1
87.5%	18.4	25.0	32.3	40.5	49.2	58.2	67.6	1:17.3
85%	18.9	25.7	34.3	41.7	50.6	59.9	69.5	1:19.6
82.5%	19.5	26.5	35.4	43.0	52.2	61.7	71.7	1:22.0
80%	20.1	27.3	36.5	44.3	53.8	63.6	73.9	1:24.5
77.5%	20.8	28.2	37.7	45.7	55.5	65.7	76.3	1:27.3
75%	21.5	29.1	39.0	47.3	57.4	67.9	78.8	1:30.2
72.5%	22.2	30.1	40.4	48.9	59.4	70.2	81.5	1:33.3
70%	23.0	31.2	41.9	50.6	61.5	72.7	84.4	1:36.6

Goals: 11.11/22.6/50.3/1:54.8

%	150m.	200m.	250m.	300m.	350m	400m.	450m.	500m
95%	16.7	22.7	29.3	36.7	44.6	52.7	61.2	1:10.0
92.5%	17.1	23.3	30.1	37.7	45.8	54.1	62.8	1:11.9
90%	17.6	23.9	31.0	38.8	47.0	55.6	64.6	1:13.9
87.5%	18.1	24.6	31.8	39.9	48.4	52.7	66.4	1:16.0
85%	18.7	25.3	32.8	41.0	49.8	58.9	68.4	1:18.2
82.5%	19.2	26.1	33.8	42.3	51.3	60.7	70.4	1:20.6
80%	19.8	26.9	34.8	43.6	52.9	62.6	72.6	1:23.1
77.5%	20.5	27.8	36.0	45.0	54.6	64.6	75.0	1:25.8
75%	21.1	28.7	37.2	46.5	56.4	66.7	77.5	1:28.6
72.5%	21.9	29.7	38.4	48.1	58.4	69.1	80.2	1:31.7
70%	22.6	30.8	39.8	49.8	60.5	71.5	83.0	1:35.0

Goals: 10.95/22.3/49.5/1:53.2

%	150m.	200m.	250m.	300m.	350m	400m.	450m.	500m
95%	16.4	22.3	28.9	36.1	43.9	51.8	60.2	1:08.8
92.5%	16.9	22.9	29.7	37.1	45.0	53.2	61.8	1:10.7
90%	17.4	23.6	30.5	38.2	46.3	54.7	63.5	1:12.6
87.5%	17.9	24.2	31.4	39.2	47.6	56.3	65.3	1:14.7
85%	18.4	25.0	32.3	40.4	49.0	57.9	67.2	1:16.9
82.5%	18.9	25.7	33.3	41.6	50.5	59.7	69.3	1:19.2
80%	19.5	26.5	34.3	42.9	52.1	61.6	71.4	1:21.7
77.5%	20.2	27.4	35.4	44.3	53.8	63.5	73.8	1:24.3
75%	20.8	28.3	36.6	45.8	55.5	65.7	76.2	1:27.1
72.5%	21.6	29.3	37.9	47.4	57.5	67.9	78.8	1:30.1
70%	22.3	30.3	39.2	49.1	59.5	70.4	81.7	1:33.4

Goals: 10.80/21.9/48.80/1:51.6

%	150m.	200m.	250m.	300m.	350m	400m.	450m.	500m
95%	16.2	22.0	28.5	35.6	43.2	51.0	59.2	1:07.7
92.5%	16.7	22.6	29.2	36.6	44.3	52.4	60.8	1:09.5
90%	17.1	23.2	30.0	37.6	45.6	53.8	62.5	1:11.4
87.5%	17.6	23.9	30.9	38.6	46.9	55.4	64.3	1:13.5
85%	18.1	24.6	31.8	39.8	48.2	57.0	66.3	1:15.6
82.5%	18.7	25.3	32.8	41.0	49.7	58.7	68.2	1:17.9
80%	19.3	26.1	33.8	42.3	51.3	60.6	70.3	1:20.4
77.5%	19.9	27.0	34.9	43.6	52.9	62.5	72.6	1:22.9
75%	20.5	27.9	36.0	45.1	54.7	64.6	75.0	1:25.7
72.5%	21.2	28.8	37.3	46.6	56.6	66.8	77.6	1:28.7
70%	22.0	29.9	38.6	48.3	58.6	69.2	80.3	1:31.8

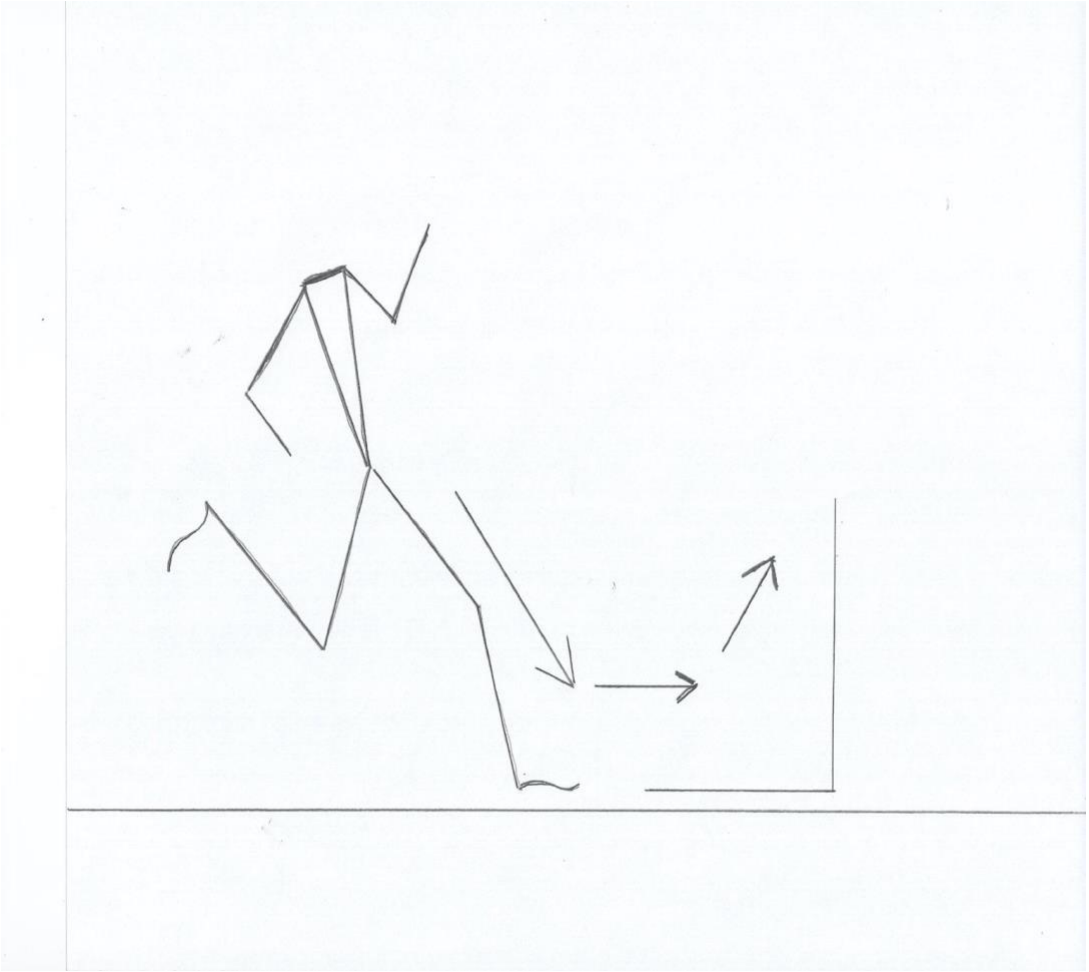
Goals: 10.65/21.6/48.2/1:50.0

%	150m	200m	250m.	300m.	350m	400m.	450m.	500m
95%	16.0	21.7	28.0	35.1	42.5	50.2	58.2	1:06.6
92.5%	16.4	22.3	28.8	36.0	43.7	51.6	59.8	1:08.4
90%	16.9	22.9	29.6	37.0	44.9	53.0	61.5	1:10.3
87.5%	17.4	23.6	30.4	38.1	46.1	54.5	63.2	1:12.3
85%	17.9	24.2	31.3	39.2	47.5	56.1	65.1	1:14.4
82.5%	18.4	25.0	32.3	40.4	48.9	57.8	67.1	1:16.7
80%	19.0	25.8	33.3	41.6	50.5	59.6	69.2	1:19.0
77.5%	19.6	26.6	34.4	43.0	52.1	61.6	71.4	1:21.6
75%	20.3	27.5	35.5	44.4	53.8	63.6	73.8	1:24.3
72.5%	21.0	28.4	36.7	45.9	55.7	65.8	76.3	1:27.2
70%	21.7	29.4	38.1	47.6	57.7	68.1	79.0	1:30.3

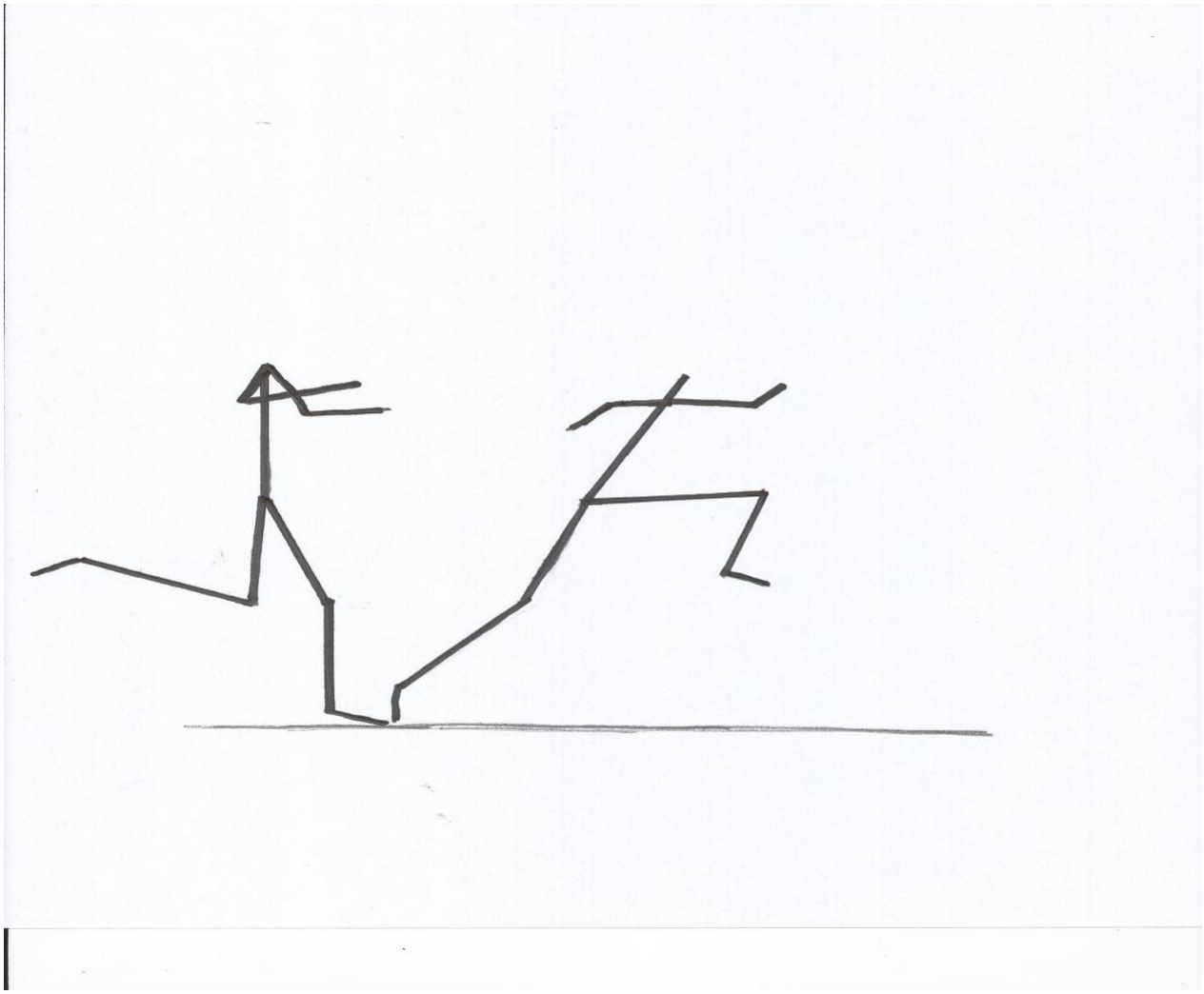
Goals: 10.51/21.3/47.4/1:48.3

%	150m	200m	250m	300m	350m	400m	450m	500m
95%	15.8	21.4	27.6	34.5	41.9	49.4	57.3	1:05.5
92.5%	16.2	22.0	28.4	35.5	43.0	50.8	58.9	1:07.3
90%	16.6	22.6	29.2	36.5	44.2	52.2	60.5	1:09.1
87.5%	17.1	23.2	30.0	37.5	45.5	53.7	62.2	1:11.1
85%	17.6	23.9	30.9	38.6	46.8	55.3	64.1	1:13.2
82.5%	18.2	24.6	31.8	39.8	48.2	56.9	66.0	1:15.4
80%	18.7	25.4	32.8	41.0	49.7	58.7	68.1	1:17.8
77.5%	19.3	26.2	33.9	42.3	51.3	60.6	70.3	1:20.3
75%	20.0	27.1	35.0	43.7	53.0	62.6	72.6	1:23.0
72.5%	20.7	28.0	36.2	45.3	54.8	64.8	75.1	1:25.8
70%	21.4	29.0	37.5	46.9	56.8	67.1	77.8	1:28.9

The picture below (don't judge me!) shows the take-off error that causes excessive braking forcing the take-off leg to experience excessive amortization. As you can see, forces are projected downward with an upward opposite response. But just as important, the hurdler is still moving toward the hurdle without any take-off lift occurring. There's not enough time to lift the lead knee into the appropriate technical position because you are moving toward the hurdle so fast, cutting down the take-off distance. The resulting response is to throw the lead leg upward from the lower leg (shin and foot) instead of using the hammy-glut-core connection.



In this picture, you can see the hurdler has their take-off foot closer to the center of mass inhibiting any downward forces. This keeps the hurdler moving in the direction of the run and allows plenty of time for the hurdler to use the muscle chain to lift the lead leg in preparation for the hurdle clearance. Notice how long the take-off foot stays on the ground in an attempt to leave the foot as far behind the hips as possible (looking similar to a long jump take-off).



Thanks to my Mentors

Bert Lyle
Dan Pfaff
Tony Wells
Curtis Taylor
Dennis Shavers
Ralph Mann
Joel Pearson
Pat Henry
Kebba Tolbert
Christopher Richardson
Jeannette Bolden
Dixon Farmer
Eddy Washington
Cedric Walker
George Williams
Curtis Frye
John Smith
Robert Johnson
Frank Hicks
Clyde Hart
Lyle Knudson
Boo Schexnayder
Brooks Johnson
Caryl Smith-Gilbert
Gary Winckler
Hitoshi Takata
Mike Holloway
Vince Anderson
Andy Eggert
Bobby Kersee
Don Strametz
Hal Harkness
Frank Hicks
Amy Deem
Bill Carson
Jim Bush
Latif Thomas
Robert H. Johnson
Matthew Barreau

I know I am missing someone, and I am sorry, but my experience is a rich collage of philosophies and innovative approaches.