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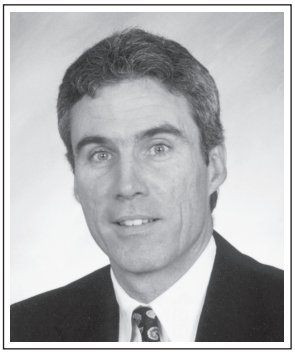
FROM THE EDITOR

RUSS EBBETS

WHY WE DO WHAT WE DO



Why do we do what we do? It's either a poorly worded question or a moment of introspection. One way or the other it might cause a moment of pause to figure out—why we do what we do.

At its core coaching is the effort to help people. This is a form of service where guidance and knowledge are passed along to help one achieve aspirations and goals but also understanding and self-satisfaction. Some even achieve fame and fortune but for the vast majority athletic careers can be summed up with a mark or time and a short list of life lessons. One of the downsides for the three-season coach is that there is rarely the downtime needed for moments of introspection. It's always about today's practice, the meet this weekend or preparation for next season. It becomes tough to appreciate the beauty of the forest when all you can see is trees.

Some institutions wisely offer their educators occasional sabbaticals where one can take some time off to recharge. It might entail travel, meeting new people or even writing a book. A sabbatical offers the chance to wander or wonder or a little of both.

Will Freeman, long-time coach at Grinnell College and former head of USATF's Coaching Education, did all three. He took some time off, bought a motorcycle and hit the road to ponder the mysteries of his life and the universe. His book, *The Quest: On the Path to Knowledge and Wisdom* is the result of a 10-year journey of self-discovery that included chance meetings with men and women, quasi-mythical characters and even a plucky kangaroo that combined to lead to the crystallization of Will's convictions and the courage to actively pursue and ultimately trust the results.

Introspection offers the chance to examine the why's of how you've gotten what you've got, review one's good fortune, missteps or false starts and digest the lessons learned from each.

What did Will learn? It is safe to say it never gets easy. Probably his most lasting take-away is that it solidified his fundamental principles and values that have made him a successful coach, teacher, father and husband.

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AN "OLD SCHOOL" APPROACH TO STRENGTH TRAINING FOR MIDDLE DISTANCE AND DISTANCE RUNNERS

Peripheral Heart Action Training? What's that? Coach Steadman explains this strength training system and offers a circuit of 11 exercise stations for middle and long distance runners.

BY MONTY STEADMAN

INTRODUCTION

In any discussion of middle distance and distance training the subject of strength training sooner or later will come up. Almost all coaches and experts agree that some type of strength training other than running should supplement the running training. Injury prevention due to improved muscle and tendon strength, improved posture, improved core strength, general greater overall fitness, and improved muscular efficiency are a few of the benefits attributed to strength training.

The disagreements among coaches as well as some experts come from opinions about how this strength training should be conducted. Should this strength training consist of body weight exercises such as push-ups, bar work, core exercises, plyometric training, etc., or should it include actual weight training, or a combination of some or all of these methods? If the choice is weight training, what types of lifts, number of sets, number of repetitions, and amount of weight lifted should be incorporated into a strength training program?

There is a lot of information from various sources concerning strength training. The problem for each coach is determining which of the various types of programs best meet the specific needs of a particular team or squad and its individual athletes.

This article is the description of a strength training program that was developed from various previously existing systems and tailored to meet the strength training needs of middle distance and distance runners at the high school and community college level. Most coaches, to meet specific program needs, "borrow" and then modify ideas and workouts from other coaches and experts. The strength training program discussed here is a combination of "borrowed" ideas, concepts and procedures.

PROGRAM NEEDS

As a high school cross country and track & field coach wanting to the do the best for the middle distance and long distance runners on our team, I felt that there were some specific areas of need to be addressed when constructing a strength training program.

- *Weight Training only:* Since body weight exercises, core training, and plyometric drills were a part of the team's daily warm-up sequence already, any weight training program did not need to include those features already present in the warm-up sequence.

- *Limited time:* Because cross country and track & field practices lasted for about two and a half hours a day for middle distance and distance runners, along with some time spent on drills, most of the practice time was spent on running workouts. There were only small segments of time that could be spent in the weight room doing strength training. The system had to allow no time for middle distance and distance runners standing around the weight room doing nothing while waiting to lift. These runners had to be able to get into the weight room and complete a workout within a short period of time.

- *Medium to large groups in a limited space:* The weight room at the school was on the small side and usually full of various athletes. In the fall, football players and pre-season winter sports athletes were working alongside the cross country runners. In the spring the weight room was also full of sprinters, hurdlers, jumpers, and throwers. The program had to be conducted in a specific area of the weight room that kept the middle distance and distance runners out of the way of the other athletes.

- *Cardio component:* Although the goal of strength training with weights is primarily muscular strength, I wanted muscular endurance and cardio fitness to have a place in this training.

- *Reduction of localized and general muscular post-workout soreness and tightness:* One of the results of training with weights is muscular soreness as well as muscular tightness for a day or two after a hard workout. I did not want to sacrifice any running workout quality because athletes were sore, stiff, or tired the day after being in the weight room.

- *Individualization of training poundages:* Every athlete is an individual with different capacities for work. I did not have a "one size fits all" program for running workouts, so I did not want all of the athletes lifting the same weight per exercise in the weight room. We needed a program that could be adjusted for individual differences.

The first three program needs listed: weight training only, limited time, and limited space, were easily met by developing a traditional circuit training program. A small area of the weight room could be set up for circuit training with a station for each required exercise. The athletes in pairs or groups could move through the circuit from station to station on signals with time for rest and recovery built into the time allotted at each station.

ONE OF THE RESULTS OF TRAINING WITH WEIGHTS IS MUSCULAR SORENESS AS WELL AS MUSCULAR TIGHTNESS

We set up a circuit, put the athletes through that circuit, and the whole process worked all right, but I was not happy with it. There was still too much down time for the athletes. Some were challenged by the workout and some found it too easy. I was searching for a better and more efficient way of strength training. Then while attending a track & field coaches' clinic I heard a speaker who changed my ideas concerning strength training circuits for middle distance and distance runners.

PRERIPHERAL HEART ACTION TRAINING

The speaker at the clinic was the late great Chuck Coker, former cross country and track & field coach at Occidental College and, after leaving Occidental in1961, executive in a company that produced a variable resistance weight machine. He was speaking about a workout that could be performed on his weight machine called Peripheral Heart Action Training (PHA Training.) PHA Training was a system of strength training developed by Dr. Arthur Steinhaus in the 1940's. This system was used by a few body builders in the 1950's. Although Coach Coker was indirectly promoting his weight machine, the PHA concepts that he spoke of made sense to me and opened

up some possibilities for change in our middle distance and distance runners' strength training program. While Coach Coker offered very little research data, he presented a lot of empirical evidence concerning his system, the basic structure of PHA. This is how he explained his system as I remember it:

- During a PHA exercise session blood flow is directed to the various extremities of the body in an alternating fashion. There would be an exercise using the legs and lower body, followed by an exercise using the arms and upper body, and then followed by an exercise using the large muscles of the trunk. Then that alternating exercise pattern would be repeated. This established pattern alternating lower body, upper body, lower body, and upper body exercises was the basis for PHA Training. All exercises involved large muscle groups, and these exercises were performed in an exercise circuit. There were no specialized or small muscle exercises.

- Each exercise would be followed immediately by the next exercise with no rest or recovery between the exercises in the circuit. Recovery would occur in the exercised muscle group while the next muscle group was being exercised.

- Large quantities of needed blood were shunted throughout the body with each change of exercised muscle groups, allowing the previously exercised muscle group to recover while the next group was being exercised, thus reducing lactic acid buildup within each previously exercised muscle group.

- At each station on the weight machine circuit the athlete could immediately change the weight setting to meet his or her needs. There was no need to stop and set up bars or dumbbells. This allowed the athlete to finish one exercise and then move immediately to the next exercise with almost no rest.

- During a circuit (a series of exercises) the athlete's heart rate would remain at a high level, but due to alternation of exercised muscle groups during the circuit localized muscle fatigue was held to a minimum because each exercised muscle group would recover while the next muscle group was being exercised.

- At the end of each circuit around the weight machine a rest interval was taken during which the athlete's heart rate would again become normalized.

- The number of repetitions per exercise was 10 for the upper body exercise stations and 15 for the lower body and trunk exercise stations. The number of circuits could vary from three to five circuits in a single session depending on each athlete's fitness level and conditioning needs.

- The amount of weight lifted at each station was adjusted to meet each individual athlete's ability to perform the ten or fifteen repetitions with some stress but without "burning out" before completing the task at each station.

Coach Coker claimed through mostly empirical evidence, that athletes' running performances were greatly improved due to the PHA Training program. He believed his program would develop and increase general muscular strength while at the same time improve cardiovascular efficiency. He especially felt that his system aided middle distance and distance runners. After hearing Coach Coker's presentation and asking a few pertinent questions, I headed home armed with new knowledge concerning strength training. It was with this knowledge that I constructed the PHA circuit training program that I used for the rest of my coaching career, as a high school coach in the 80's and 90's and then as a California Community College assistant coach in 2000's and again in the 2010's.

COKER BELIEVED HIS PROGRAM WOULD DEVELOP AND INCREASE GENERAL MUSCULAR STRENGTH WHILE AT THE SAME TIME IMPROVE CARDIOVASCULAR EFFICIENCY

I did not abandon the body weight, core, and plyometric exercises that my athletes performed during workouts. I just added PHA Training to what we were already doing. Using a PHA Training circuit, my athletes appeared to develop and improve general muscular strength, overall fitness, as well as maintain aerobic fitness in the weight room while away from the track and running trails. This PHA Training program was not a substitute for running, but rather, it was an addition to the running program. As with Coach Coker, my evidence is empirical, based on my observations of athletes not using the program and then using the

program. Being a busy coach and teacher, observation was all that I had time for. Below is a description of the PHA Training program that I have used extensively with my middle distance and long distance runners.

THE SET-UP

Coaches must use and adapt local facilities for this PHA circuit. Where variable resistance machines are available, these machines should be utilized. Free weight stations can be set up for exercises that cannot be performed with weight machines. Eleven stations should be set up with a numbered poster listing each designated exercise and its number of repetitions attached to each station. The stations and exercises are as follows:

1. *Incline Sit-Ups x 15 reps.* (Trunk/core strength) This station should consist of an incline sit-up bench at a medium setting. Several additional 5,10, 15, and 25 lb. plates or dumbbells can be provided for those athletes who are not challenged by the medium setting and need additional resistance to stress their trunk and core muscles.

2. *Double Leg Curl x 15 reps.* (Lower body strength) This station should utilize some sort of leg curl machine. A variable resistance machine is the most desirable. During the recovery movement of each repetition of this exercise, the athlete should concentrate on slowly lowering the weight thus creating a stressed concentric contraction of the hamstring muscle group.

3. *Chest or Bench Press x 10 reps.* (Upper body strength) A variable resistance machine is the most desirable although a standard bench press bench and bar can be used.

4. *Calf Raises x 15 reps.* (Lower body strength) If no machine is available, the athlete can use a barbell placed on the shoulders with toes placed on a 2"/4" piece of wood to provide forefoot foot elevation.

5. *Seated Rowing with Bent Knees x 10 reps. (Upper body strength)* If no machine is available, Bent Rowing with a barbell can be substituted.

6. *Leg Extensions x 15 reps. (Lower body strength)* This station should utilize some sort of leg extension machine. A variable weight machine is the most desirable.

7. *Seated Overhead Press x 10 reps. (Upper body strength)* If no machine is available, athletes can perform the exercise sitting on a bench with a barbell.

8. *Leg Press x 15 reps. (Lower body strength)* This station should utilize some sort of leg press machine. A variable weight machine is the most desirable. If no machine is available the athlete can perform Half Squats with a barbell.

9. *Pull-Downs with a Shoulder Width Grip x 10 reps. (Upper body strength)* If no machine is available the athlete can perform Pull-Ups on a chin-up bar.

10. *Good Mornings x 15 reps. (Trunk/core strength)* This exercise must be performed with free weights. Please note: This exercise should not be performed in the traditional way, with the bar on the shoulders behind the neck, but rather with the bar hanging from the straight arms in front of the shins and thighs.

11. *Hanging Bent-Knee Lifts x 15 reps. (Lower body strength)* This exercise is performed with the athlete hanging from a chin-up bar. As the athlete improves in strength, the exercise can be performed with various ankle weights

12. Jog/Run 400 to 500 meters after each circuit (Recovery time) At the completion of each circuit, the athlete, depending on fitness level, runs or jogs 400 to 500 meters before repeating the next circuit or ending the workout. (Based on individual fitness goals and needs, the recovery run can be longer than 500 Meters.)

It is important that all exercises should be performed in an order that alternates trunk, upper, and lower body exercises similar to the order presented above. Guidelines:

- With the exception of Sit-Ups, Good Mornings, and Hanging Bent-Knee Lifts, all exercises if possible should be performed on variable resistance machines so that the athlete can move quickly from exercise to exercise and be able to set each exercise weight with a minimum break between exercises. There should be no rest periods between exercises. The recovery occurs during the jog/run between circuits.

- The first week that the beginning athlete performs this workout, only one circuit should be per-

formed. Each week a circuit should be added, until by third week the athlete is performing three circuits. (For athletes performing daily full running workouts, no more than three circuits should be performed in a session.)

- The starting weights for each exercise should be light enough so that the athlete can perform the 10 or 15 repetitions with medium stress. Weight increases should be based on the individual athlete's ability to perform each exercise with decreasing stress. As stress decreases, the exercise weight can be increased. There is no hard and fast rule here.

- This is a cardio as well as strength workout, so cardio responses should be monitored frequently. If an athlete's HR is above 120b/130bpm after the recovery jog, rest should be taken until the HR returns to 120/130bpm or less. If continued cardio stress occurs after the recovery run, the amount of weight lifted at each station should be reduced.

- This is a "recovery day" workout and should be performed after running workouts have been completed, never before running workouts, and usually not on hard running days or days before competition. This workout can be performed on competition days after competition has been completed, if the athlete is up to it. Warm-down type running can and should be performed at the conclusion of this circuit training.

- Every athlete on a cross country team or in middle distance and distance runner's event group should be performing this workout at least twice per week during pre-season as well as during the competitive season. The positive effects of this workout on strength and fitness begin to diminish rather quickly after more than a seven to ten day respite, so this workout should not be eliminated for more than seven to ten days before it is resumed.

BECAUSE OF THE INDIVIDUALIZED NATURE OF THE WORK STATION LOADS, VARIOUS ATHLETES WHILE DOING THE SAME WORKOUT COULD PROGRESS AT THEIR OWN RATES

- During the championship part of the season the workout frequency can be reduced to once per week for maintenance and then eliminated in the week(s) before the final major meets.

LOGISTICS

This PHA Training circuit set-up can handle up to 25 athletes at a time. If the athletes in a group line up in front of Station 1, they can continually move through the circuit following each other. As an athlete completes an exercise the next athlete can move up into that station. In this manner athletes can continually move from station to station, complete the recovery run and then start the circuit over.

With groups of athletes larger than 25, the squad or group can be split into two or even three sub-groups. While one sub-group is performing the circuit, the other sub-group/s can be doing some sort of running or drill work near the weight training facility. Since this workout usually takes about 20 to 25 minutes or less to complete 3 circuits, when the first sub-group has finished, that sub-group can run or drill while the second or third sub-group comes in to perform the circuit. A creative coach can find ways to accommodate large team groups during this workout.

For stations where free weights must be used, three bar bells of different weights can be set up at the station. When the athlete reaches that station, he or she can select the bar which is weighted closest to the athlete's needs. With pre-set bars, there is no time wasted adding or subtracting weight from those bars.

CONCLUSION

Because of the nature of the workout, as well as its unique logistics, I was able to handle large groups or small groups of athletes with equal efficiency and effectiveness. This workout met all of the program needs discussed at the beginning of this article.

In my years of coaching at various levels, I have found this workout to be very effective in improving the basic strength and cardio fitness of my athletes with minimum side effects the following day. I actually found that because of the continued high cardio response during the alternating muscle group work, this workout appeared to enhance recovery due to minimal lactic acid accumulation in each exercised muscle group during a complete circuit. I observed a minimum of

soreness and stiffness in my athletes the day after they performed this workout.

Also, because of the individualized nature of the work station loads, various athletes while doing the same workout could progress at their own rates. While I have no statistical evidence to support these claims, I have reached these conclusions through careful observation.

While empirical evidence may not be as valid as statistical evidence, many coaches must rely on empirical evidence when constructing training programs. I have observed my athletes perform better in workouts and races when regularly completing this workout than when they did not regularly complete it. Also, when my athletes moved onto other higher levels of competition they would return to ask me for printouts of this workout so that they could continue to use it. They felt that doing this workout helped them perform better in running workouts and races and, also, better recover from hard races and workouts.

Although some may consider this PHA Training circuit "old school", it might be worth trying out for a season.

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Monty Steadman was a California high school cross country and track & field coach for 38 years, and after retirement assisted at the California Community College level another six years. He is the author of *Coaches Guide To Cross Country and Track And Field Training Cycles,* Coaches Choice, 2015.

From the Editor

Continued from page 6906

The ideal condition
Would be that we should
be right by instinct;
But since we are likely
to go astray,
The reasonable thing is
to learn from those
who can teach.
-Sophocles

We can learn through trial and error or find role models and mentors who, as they can, and as we'll let them, enlighten our chosen path resulting in a deeper understanding of the "why."

On a different note—congratulations to the Rio Olympians, their coaches and support staffs. In spite of all the drama before the Games from a spectator's point of view it was a great show.

For the USA there were a few surprises with the emergence of new talents that bode well for the future of the sport. Of particular note were U.S. performances in areas where we have not been particularly strong such as the women's shot, the steeplechase, 1500m and the triple jump. For the veterans for whom Rio will be the "last time 'round" a sincere thank you for the great memories.

It is safe to say Usain Bolt is a once-in-a-lifetime athlete with his completed triple-triple, the culmination of a great program. In this issue Vaughan Nembhard, a former Jamaican athlete and current coach, sheds some light on the Jamaican program that produced 11 track & field medals in Rio, third only to Kenya and the United States.

INTERVIEW WITH VAUGHAN NEMBHARD (AUGUST 2016)

Vaughan Nembhard is the head track coach at Westminster Academy, Fort Lauderdale, Florida. He is also adjunct professor in the school of business at St. Thomas University, Miami Gardens, Florida. As an athlete, he competed for his Jamaican prep team, Calabar High School, participating with the 3-time Boys Champs title team in 1988, '89, and '90, as a 400m runner and hurdler. At Florida International University, he was a three-time conference champion in the hurdles and competed later with the New York Pioneer Club 1998-2001. Editor Russ Ebbets ran into Coach Nembhard at a USATF Coaching Education course and thought our readers would find Nembhard's thoughts on Jamaican track & field of interest.

BY RUSS EBBETS

1. Tell us some things about Jamaica—population, size of the country, and so on.

Jamaica is an island nation in the Caribbean with a population of just under 3 million people, just about the number of people residing in the State of Nevada. The former British colony gained its independence in 1962, adopting its own flag—green black and gold—to represent its people, the lush vegetation, and the golden sun. The Jamaican motto is Out of Many One People, and Jamaica is famous for its Blue Mountain Peak coffee and its many rivers—most famous is Ocho Rios.

2. Who was Herb McKenley and what did he mean to Jamaican track & field?

Honorable Herb McKenley was my high school coach. He meant many things to different people but in essence he guided many youth to realize their full potential. He actually brought a group of Kingston College athletes to the Penn Relay Carnival, the first ever Jamaican High School team at Penn. If you know the history and rivalry between Kingston College and Calabar it just shows how huge his heart was. Herb showed many kids and their parents the potential that track and field really had in changing their lives for the better.

Herb, by the way, was a silver medalist in the 100 and 400 at the 1952 Olympics, and gold medalist in the 4x400, with the fastest relay leg ever at the time: 44.6. He also set three world records in the 440.

3. Is there a coaching philosophy that permeates the sport in Jamaica?

I don't know that Jamaica has a philosophy as it relates to coaching because there seems to be a lot of coaching geared around high

school development. The club scene is still relatively new and sits in an infantile stage though we do have the Racers and MVP clubs with the likes of Olympic Stars. Each club seems to have their own route to success but as a nation I can't say that I can pinpoint that there is a permeating philosophy which our coaches go by more than to win Boys and Girls Champs.

4. Daley Thompson, Ben Johnson, Sanya Richards-Ross and Sandra Farmer-Patrick all emigrated from Jamaica and had great careers. What do you see as the cause of this talent drain that has gone on for decades?

Professional and scholastic opportunities have been the two main contributing factors to the talent drain. As close as 20 years ago, many athletes saw track & field as their first chance to travel, a viable option of getting an education and forging a professional career, because Jamaica simply did not have a system after the high school level. I myself saw the NCAA as an opportunity which I was able to explore. It was while in the second year of my high school career that coach McKenley explained to us that in track & field you have a chance to get paid for doing something that you love and a scholarship is one way to get an education while still running and enjoying yourself.

***5.* What is the educational set-up of Jamaica and how does sport tie in?**

The system goes from Basic School to Primary to Secondary and then Tertiary. Sport is tied in at every level from Basic School which would be the equivalent of Pre K to 7. At this level kids are

Sandra Farmer-Patrick

introduced to a sports day filled with mainly athletics events. This happens at every level, then you will find more serious competition beginning at the Primary level with their annual championships just as the high schools. At the Tertiary, level there are the Intercollegiate Games/Championships.

The bulk of the activity and rigid competition takes place at the high school level. Students are introduced very early to a variety of sporting activities from cricket, basketball, track and field, soccer, swimming and netball (girls), just to name a few.

6. How is the development of talent handled in Jamaica? Is there a Junior Olympic program or a national talent identification and testing program?

Jamaica development system basically boils down to "cream rising to the top." The physically and mentally stronger athletes are pulled into the next level of development. Puma's investment a few years ago has helped with developing talent that would have in other years disappeared or be lost to some other system, be it a professional career or college. Private companies are now investing in the top youth athletes as they leave the high school system, following suit of the success of Puma with Usain Bolt. Before Bolt there was Michael McDonald who stayed home and represented Jamaica in the 400 and 4x400 in the Atlanta and Sydney Olympics of 1996 and 2000 respectively. That was kind of the beginning of the home-grown athlete's talent development. I spoke with Davian Clarke, NCAA Champion 400m and Olympic medalist, who stated, "I look back and the main reason I was successful in track was due to personal private sponsors who provided me with all I needed to rise to the top and separate myself from others while growing up in Jamaica."

When it comes down to it talent is often times mismanaged in Jamaica due to the lack of understanding of how to assist athletes in transitioning to the next level. There's no emphasis on junior development so there is no Junior Olympic program, the closest thing we have to that is Boys and Girls Champs and that is not sufficient to maintain a balanced pool of juniors to prepare them for the senior level.

7. How are the high schools differentiated? Are some more academically oriented than others?

High schools are predominantly

single sex with a couple of coed institutions, like St. Jago High School. They go from Grade 7-11 with an option to go to grade 12-13. Some schools are more academically inclined (i.e., Campion College and Immaculate Conception), while some are more athletically known (Calabar High and Kingston College) with Wolmer's Boys and Girls (Shelly-Ann Fraser-Pryce's alma mater) having a very good balance of rich athletic and academic programs. Most every school has some religious affiliation be it Baptist, Catholic, Presbyterian but the point is they are mainly Christian-based.

8. How strong is the club system? Are the clubs affiliated with the schools or independent? Are they spread throughout the country or clustered in the larger areas?

The club system has been around for some time and is currently dominated by MVP and Racers Track Club coached by Stephen Francis and Glen Mills respectively. Both teams have produced significantly internationally with the likes of Usain Bolt, Shelly-Ann Fraser-Pryce, Yohan Blake and Melaine Walker, just to name a few. There is an increase in the number of clubs and there is some level of affiliation to the colleges. Cameron Blazers headed by World Champ Bert Cameron is tied in with Mico Teachers College, while Racers Track Club is tied to the University of Technology formerly CAST, the home of the early club powerhouse—Bolts of Lightning. Bolts of Lightning was once headed by the Grandfather of Jamaican Sprinting and San Jose State alumnus—Dennis Johnson. However most of the clubs are located in the Kingston Area with a few spread around the country with Sprintech (G.C. Foster College) and Swept Track Club (not sure if they are still around).

MOST OF THE CLUBS ARE LOCATED IN THE KINGSTON AREA WITH A FEW SPREAD AROUND THE COUNTRY

9. Jamaica is a northern hemisphere country but with the Caribbean weather and basically one season. How are the sport "seasons" broken up in Jamaica?

Speaking about the high school seasons, the major sports Football (soccer), Track & Field, Basketball and Cricket have some space between them. You would find that football goes from September to November, then Basketball comes in till March, while track goes from January to June. Cricket overlaps track & field however the two-sport athlete rarely attempts track and cricket.

10. What are the facilities like? The National Stadium in Kingston hosted the World Juniors in 2002. Are there other facilities around the country?

In Jamaica there are a about five decent running tracks—The National Stadium, G.C. Foster Sports College, Catherine Hall, University of the West Indies, and Calabar High School. The facilities are in need of better quality equipment. The National Stadium is the best of the facilities but there is a need for better high jump mats, pole vault pits and full flights of hurdles. There is one fairly decent grass facility in Sligoville.

11. I had a friend who was coached by the legendary coach Foggy Burrowes—who was he in Jamaican sport?

Sydney Ignatius "Foggy" Burrowes. Though I never knew him personally, he was a great icon to the sport and its development in Jamaica. Foggy was the editor of the Sports Life magazine alongside Errol Townsend. I had the pleasure of reading one of his articles—"Fools Compete"—from the 79th edition published in 1967. I still have that piece which is nestled on page 15 of the 1991 Boys Champs Preview, the cover of which is graced by Donovan Powell and Inez Turner. A graduate and later Sportsmaster of Kingston College, Foggy was a very dedicated person in the sport, caring for his athletes, travelling great distances to make sure his athletes were well taken care of. Despite being hit with polio, Foggy never stopped, though the disease put him in metal braces so he could walk. He marched on determined and with purpose.

12. Are there any national coaching programs similar to the USATF Coaching Ed or is the IAAF system used?

The G.C. Foster College of Physical Education and Sport offers diploma courses in Coaching and Sports Fitness as well as a Bachelor and Masters in Physical Education. Coaches in Jamaica tend to go through the IAAF courses to attain their qualifications.

13. In the U.S. track & field competes with a multitude of sports throughout the year (football, basketball, soccer, baseball, lacrosse, ice hockey), something competing every season. Is that

a problem in Jamaica with cricket and other sports?

Track & field is Jamaica's "Football". Track is a priority for many two-sport athletes. The season goes from January to March for the high school athletes while the elite and college will go from late February through June and the professional circuit. Following the high school year the major conflicting sports are soccer, from September to December, and basketball going to March. However generally for two-sport athletes, track is the sport of focus. You can see this recently with Jaheel Hyde who played in the Manning Cup for Wolmers High School competition then ran 400IH, choosing to go professional in track & field.

14. What do you see as some of the disadvantages of the Jamaican system?

As it relates to the overall system from high school there is a big focus on Boys and Girls Champs which happens the last weekend in March. Not much focus is given to regional competitions after that, while only very few will move on to summer competition at the World Youth and Junior level. Other than that:
No indoor season
Too many meets that overlap
Lack of facilities
Limited equipment
Not enough done by the government
Insufficient financial support

15. For most American track fans the Penn Relays is the first and possibly only contact with Jamaican athletics. What role historically and currently does the Penn Relays play in the sport?

When the first team travelled to the Penn Relays in 1964 it was an experience, one that has a significant place in history. The Penn Relays is one meet that gives many young athletes their first trip outside of Jamaica. Schools usually reserve this privilege or the honor of international travel to a select group of their team. The meet has provided and still provides exposure to more coaches who are recruiting, a very competitive meet, international competition and a chance to see the USA. The meet to some is a reward at the end of their high school season or career. For the fans it's electrifying and a way to see friends and teammates you have not seen in a while.

16. The gathering point for all Jamaican and Caribbean teams at the Penn Relays is "the Bickle" out in the back fields, over the railroad tracks. What exactly is a "Bickle?"

Bickle in Jamaican terms refers to food. Basically it's a synonym for food. Not any food in particular but just something to eat in general. Used in the vernacular it would read like this—"Gimme likkle bickle"

17. One of the yearly highlights at Penn is the national team relays of USA v. the World (Jamaica, Kenya, other European national teams). How big a deal is this back in Jamaica?

As it relates to the Jamaican fan base the USA v. The World series it is really not a big deal because the real focus is on the World Championships, Olympic and World Relays medals. It's only a big deal when Jamaica wins the event. If Jamaica loses it's chalked up to an unimportant meet in the calendar.

18. Do you see the U.S. educational system as a goal for many young Jamaicans for college? In your opinion is this beneficial or a complicating factor in these athlete's careers?

There are levels to this and depending on your level, a variety of opportunities will present themselves. For the sake of conversation let's look at the top junior athletes in Jamaica. It can be complicating to someone like that who has the talent to go either way. Some have opted to stay in Jamaica and go professional, while some will test the waters in the U.S. collegiate scene. In general though, it opens up more opportunities for some who either cannot pay for a college education or if they need a safe environment to continue developing in the sport.

19. What are the Carifta Games? How important are they in Jamaica athletics?

CARIFTA Games play a significant role in our youth development on the track. This is the first taste of international competition for many of the athletes, their first time representing Team Jamaica. Some Jamaican fans would argue that the games are of no use because of the level of competition in some events that we dominate. But of course as a coach and former athlete I stand by its significance in the development of the sport within the region.

20. Are there other Caribbean meets of note?

Cayman Invitational. Chris Brown Invitational, a new meet to the calendar. Jamaica International Invitational. Central American and Caribbean Championships.

21. How much contact does Jamaica have with Cuba? Is it a friendly relationship? Are there competitions, cultural exchanges or coaching exchanges?

Very little contact at the Junior level. Cuba is a part of the CAC-Central American and Caribbean but not the CARIFTA. There is some coaching contact but less than in past years. Cuba built the Jose Marti High School and G.C. Foster College, so historically Cuba has had a major influence in Jamaica's early development but current influence is minimal.

22. What do you think about the continuing thaw in relations between Cuba and the US?

Anytime countries work towards building relations it's a great thing. Being in the South Florida region we see the news reports constantly on what is happening between the two countries. Clearly it's a good thing as Cuba recently hosted the Caribbean Scholastic Invitational in May sponsored by the National Scholastic Foundation from North Carolina. So I think it's a great thing.

23. What are the greatest obstacles you see to further Jamaican athletics—poverty, travel access, recreational drugs, gang violence, opportunities, etc.

For the most part the government needs to take a more serious approach to grass-roots development, creating programs that encourage participation beyond the high school system and working with the private sector to come on board early in the development of athletes so that we do not lose them to other negative social influences.

24. Over the last two Olympics Usain Bolt has dominated his events but Jamaica has also produced female champions Veronica Campbell and Shelly-Ann Fraser-Pryce. What impact have these athletes had on the hopes and aspirations of young Jamaicans?

Icons always leave a trail behind them for people to follow and aspire towards. Seeing their meteoric rise gives the kids a goal, a role model for the sport, some may even end up being mentored or coached by one of these athletes with varying degrees of success. Bolt's presence is truly world-wide. As you look around on the internet you can find someone doing his pose and even making the claim that they will be the next Usain.

25. Merlene Ottey and Asafa Powell were/are great competitors and always in the mix come the finals but often falling just short. Do you see Bolt's greatest contribution being that he finally broke the golden barrier for the modern group of Jamaican athletes inspiring others that they too could content for the gold?

Bolt's and Fraser-Pryce's contribution to the modern group is simply a reinforcement that greatness is within the island nation. It comes in spurts, but it comes, and that is the reminder that the young athletes, coaches and administration keep in mind to keep working in the development of the sport.

26. The 2012 Olympic Gold Medalist in the javelin is from Trinidad. Jamaican throwers like O'Dayne Richards in the shot and Fedrick Dacres in the discus have shown promise in recent years. Do you

DAVID M. BENYAK

Merlene Ottey

see the expansion of talent into non-sprint related areas continuing? Which areas?

Definitely seeing Keshorn Walcott opened a lot of eyes, especially looking at the javelin. Jamaica began a journey several years ago to improve their throwing disciplines. This may have been brought on by high schools needing a more balanced attack on the coveted Boys and Girls Champs Titles. The good thing from this is that the athletes are matriculating into competitive ranks of the NCAA and making Olympic Qualifying marks. At the Rio Games Jamaica was represented in the Discus, Shot Put, Hammer, Steeplechase and 5000m. We can definitely see the spirit continuing in these areas.

27. What type of periodization schedule do coaches tend towards? What are the focal meets

of an annual plan for a high schooler and open athlete?

I am not sure of the full break-down of what the periodization is except that in the high schools, they may begin training as early as September with a focus on the Championships the last weekend in March. The open athletes may start a little later while focusing on the National Senior Championships which occur the first week of June, with the goal of making the Olympic or World Champs team. Very few open athletes race indoors and seem not to flock to racing outside of Jamaica at the all comers meets hosted a couple of times throughout the year.

28. What are some of the weight training methods and other conditioning methods generally used? Anything unique?

Weight training methods seem to be standard in the conditioning and pre-competition phases. Jamaica is blessed with hills and fabulous beaches which play a part in the conditioning of many of its athletes.

29. On a personal level what are one or two of your fondest memories from track & field.

There are so many fond memories. 1989 at the Boys Champs, I was glad to be a part of one the most memorable races still to this day at the Championships. Calabar, not favored by any measure to win the Medley relay (400-200-200-800), did what seemed impossible, moving from just about last place after the first leg to win by some 30 meters after being in 4th place with one lap to go on the 800m anchor leg. Paul Campbell (400), Kirk Rose (200) and Floyd Howel (800) were my teammates who delivered an awesome win.

I also enjoyed representing Calabar at the Penn Relays in 1991 and 93. The trip, the atmosphere of the meet, I even recall purchasing my first Cassette Album—Terrence Trent D'Arby—and also being musically introduced to the sounds of a group called Pharcyde. I met great people, a couple of whom I kept in touch with throughout my time in college. Speaking of Penn Relays (my Olympics :-), I am honored to have earned four championship watches while competing for the New York Pioneer Track Club under coach Ed Levy, thanks to my many teammates over the 3-year run. That was my Olympics since I never was able to get ahead of some fine hurdlers like Danny McFarlane, Neil Gardner and Kemel Thompson at the trials for Team Jamaica. Still some great memories.

In closing, with the pending retirement of Usain Bolt I have been asked who is next, who will be the heir apparent. Historically after someone like Bolt transforms and dominates the sport there is a lull, so I say there is no true person at this time who will have such an impact. We will have winners and fast times and great competition but we will not have Bolt-like domination by any one person.

FLEXIBILITY: DOES STRETCHING HELP?

This article provides the reader with a preview of the online sport science courses on the new USATF Campus which offer the coaching community access to the practical sport science needed to develop and deliver a science-based training program relevant for all track and field athletes. Dr. Christine Brooks is a master teacher in sport science applied courses having taught at Penn State University, University of Michigan, and University of Florida in their Kinesiology departments in addition to directing the highly successful USATF Sport Science Coaching Education. Her work is received around the globe and she receives fantastic reviews from students and coaches who engage her courses. Review all the sport science courses on USATF Campus at: http://www.usatf.org/Resources-for---/Coaches/Coaching-Education/USATF-Campus.aspx, Terry Crawford, USATF Director of Coaching.

BY CHRISTINE BROOKS

WHAT YOU WILL LEARN

When you have completed this module you will be informed about:

1. Flexibility and its definition
2. Functional applications and ROM methods
3. Children and flexibility
4. Categories of stretching
5. Static versus dynamic stretching
6. Current flexibility position statement

FLEXIBILITY AND SPORT

Flexibility describes joint range of motion. Good flexibility is believed to permit the range of motion necessary for optimal application of the four motor performance abilities of endurance, strength, speed and coordination. Range of motion refers to the distance and direction a joint, or group of joints, can move freely and painlessly. All major joints have a normal ROM. If the range of motion is equal to, or slightly larger than the normal range for that joint the athlete is placed into the "good" flexibility category. If it is lower than the normal range the athlete is said to have "poor" flexibility.

The three main applications of flexibility in sports include (Figure 1):

- To permit high amplitude of movement in conjunction with high speed while performing a skill. An example of this application is seen in sprinting, hurdling, throwing and kicking.
- To increase time of force application for producing power. A javelin thrower, baseball pitcher, or kicker who use a full range of motion can maximize the velocity of the implement prior to release.
- To hold an exaggerated posture, sometimes for extended periods of time. An example is a cyclist

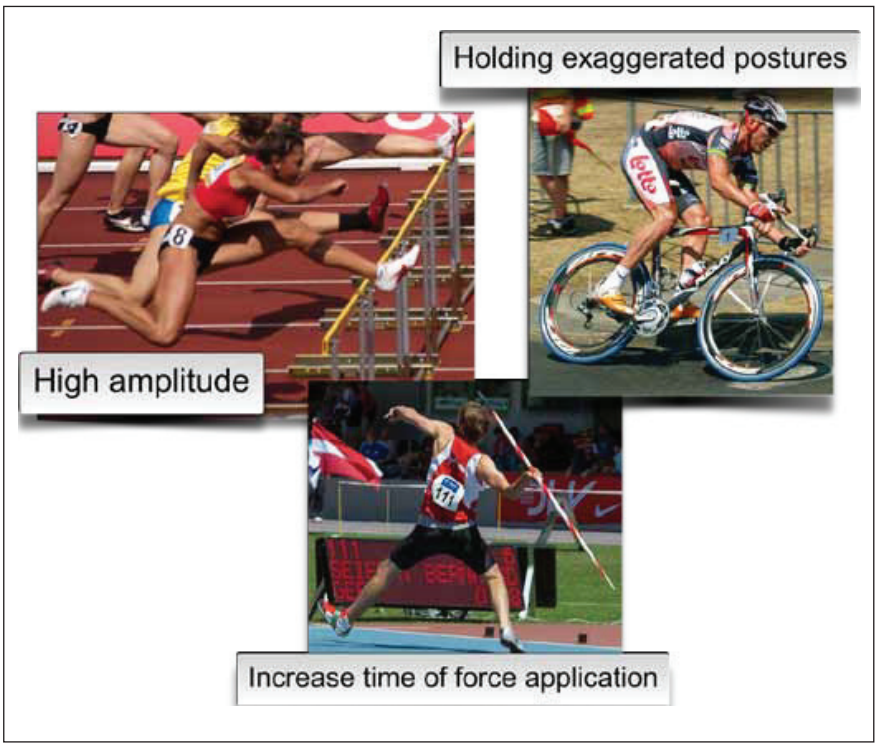

Figure 1: Functional flexibility applications

who maintains the aerodynamic forward riding position throughout the race.

Stretching is a specific form of exercise designed to improve joint range of motion. The belief is that with sufficient stretching, it is possible to increase the length of the muscle. However, theoretical physicist Stephen Hawking best reflects the state of our knowledge about the value flexibility and stretching: "The greatest enemy of knowledge is not ignorance," he said, "it is the illusion of knowledge". There is little scientific evidence for much of what is commonly accepted as the value of stretching in regard to flexibility.

It seems logical to argue that a gymnast needs more flexibility than does a soccer player. It also seems logical to assume that, based on the skills required, a soccer goalie needs more joint range of motion than other players on the team. We cannot, however, state emphatically that stretching programs benefit a sport performance, or even if extreme range of motion within joints is a positive feature of a sport phenotype. Acrobats, gymnasts and dancers have highly mobile joints. However, when chronically applying flexibility to performing extreme postures demanded for an elite performance, damage to capsules and ligaments often occurs.

The other common reason for stretching is injury prevention. There is also little credible evidence for this. Indeed, too much stretching can increase the risk of injury.

In this chapter you are introduced to selected issues related to flexibility and stretching including: strategies for achieving ROM for common sports skill; flexibility of children; categories of stretching; nervous system theory of how stretching affects a muscle; and the current European College of Sports Sciences position statement about flexibility and stretching.

ROM METHODS

Three strategies are commonly used to perform the necessary range of motion for sport skills. These include the joint compensation (relative flexibility), static-active, and static-passive (Figure 2).

Joint compensation. If the athlete lacks the necessary joint range of motion to attain a desired posture, the athlete's body will recruit the necessary range of motion from alternative joints. For example, at the bottom of the rowing catch position, a rower places the oar forward of the feet close to the bow to increase the distance for applying the force. The longer the force of application the faster the boat will go. A rower with restricted hip motion due to tight gluteal muscles will often compensate by recruiting the movement available within the lumbar and thoracic spine regions. However, repeated flexion of the lumbar and thoracic spine in this way can lead to overuse damage in the lower back and subsequent pain. The joint compensation method is called "relative flexibility", a term coined by physical therapist Shirley Sahrmann and is a potential source of chronic injury among athletes.

Static-active method. Muscles surrounding a joint come in opposing pairs referred to as agonists and antagonists. The agonist is the muscle causing the movement, while the antagonist opposes the movement. When the agonist is contracting the antagonist must relax so the joint moves. Static-active flexibility occurs when an antagonist muscle is stretched using the tension of the

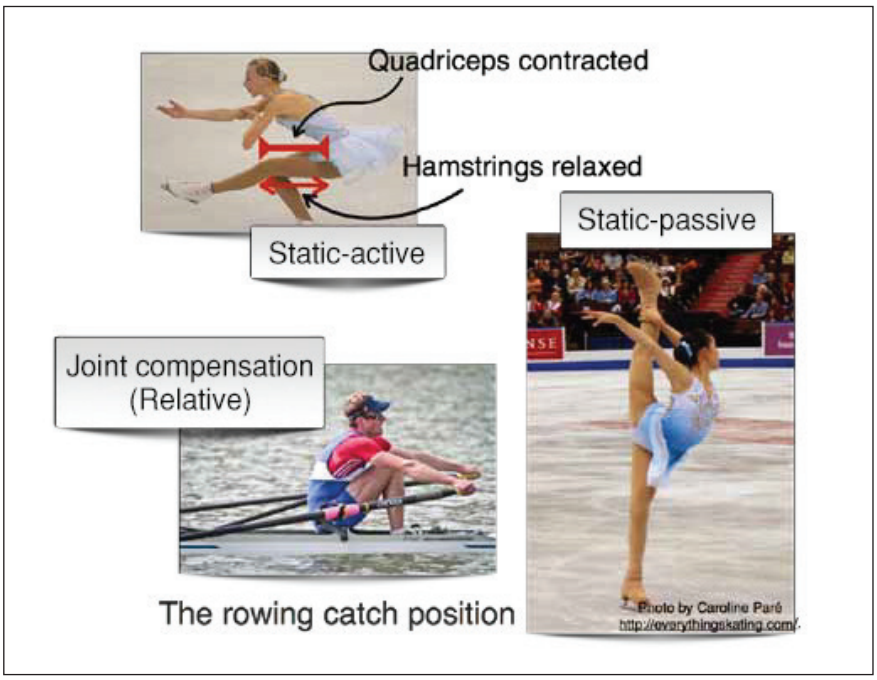

Figure 2: Methods for attaining range of motion

agonist muscle. This occurs when performing a shoot-the-duck skating pose where the leg is held high in front of the body. The quadriceps muscles and hip flexors provide the force to hold the leg up and are the agonists. The hamstrings are being stretched and are the antagonists. To perform a shoot-the-duck pose the antagonist (hamstrings) relax while agonist (quadriceps) contract.

Static-passive method. This type of flexibility is needed to assume extended positions and then maintain them using body weight, or the support of the limbs. The muscles of the limb extended into its full range of motion are not used to maintain the posture, as is true for static-active flexibility. The side splits common to dance, figure skating, martial arts and gymnastics are an example of static-passive stretching. Body weight provides the force to stretch of the muscles. The standing split during a figure skating spin is another example. In this case the skater holds her leg in the split position. Yet another example is a partnered standing front split. Pain in the hip joints can occur when the athlete lacks the necessary flexibility and compensates by tilting the pelvis forward.

Training static-active flexibility is harder than training for static-passive flexibility because of the muscle strength required to hold and maintain the posture.

CHILDREN AND FLEXIBILITY

Children under 6-7 years of age are like Play-Doh. They can mold their limbs and trunk into almost any position. Babies are just as happy sucking on their toes as they are on their thumbs.

Between 6 and 12 years, flexibility gradually declines (Figure 3). Then during the growth spurt (around 11-14 years for girls and 13-15 years for boys) flexibility often continues to decline. One explanation is that bones grow faster than the muscles and therefore they are placed under chronic stretch causing pain. When the calf muscle are short Achilles tendons strain can occur. When the bones stop growing, the problems tend to resolve as the muscle growth catches up to bone growth. The increase in estrogen is believed to allow girls to improve their flexibility toward the end of puberty.

Hypermobility is too much range of motion in a joint that possibly occurs when the tissue surrounding a joint grows faster than the bone. Some joint hypermobility is not uncommon in children. It can be an advantage for some athletes, such as for dancers and gymnasts. However, hypermobility increases the risk of joint injury. Athletes with joint hypermobility have a higher risk of joint sprain.

VARIETIES OF STRETCHING

Three broad varieties of stretching include static, dynamic and pre-contraction stretching.

Static stretching is of two types: active self-stretch and passive external assisted stretch. Active self-stretch involves elongating a muscle to its endpoint and then holding the stretched position at that length for a short time (usually 15 to 30 seconds) without using any external force to maintain the stretch. Passive stretching is also a static stretch except that an external force is used. The external force is typically a partner.

Dynamic stretching is either active or ballistic. *Active dynamic stretching* involves the muscle moving itself through a comfortable range of motion back and forth 10-12 times.

This form of stretching elongates a muscle without imposing excessive force on the tissue. Dynamic stretching is thought to have more functional application to sports movements than other forms of stretching.

Ballistic stretches involve using the momentum of a body part to rhythmic bounce muscle beyond its normal range of motion. It is a form of passive stretching in that the muscle itself is not causing itself to move. Another body part is forcing it to move. An example is a seated hamstring stretch where the upper body bounces back and forth to quickly force the hamstrings into and out of a stretched position. Ballistic stretching results in high tissue forces, and can therefore risk damage to the tendon and muscle. Rather than lengthening a muscle, ballistic stretching potentially cause a muscle to tighten due to activation of the stretch-reflex.

Pre-contraction stretching is known in the clinical setting as proprioceptive neuromuscular facilitation (PNF). This form of stretching involves alternating between stretching and contracting a muscle while gradually elongating the muscle after each contraction. There are four theoretical explanations for how PNF works: autogenic inhibition, reciprocal inhibition, stress relaxation and gate control theory.

Autogenic inhibition theorizes that low-force, long duration static stretching activates the Golgi tendon organ. After 7 to 10 seconds, muscle tension increases the GTO and temporarily inhibits the muscle spindle in the stretched muscle. This makes it possible to stretch the muscle further. In essence, autogenic inhibition relies on the protective function of the Golgi tendon organ.

Reciprocal inhibition occurs due to the cooperative nature of muscles on either side of a joint. Muscles on one side of joint relax to accommodate the muscle contraction on the other side of the joint.

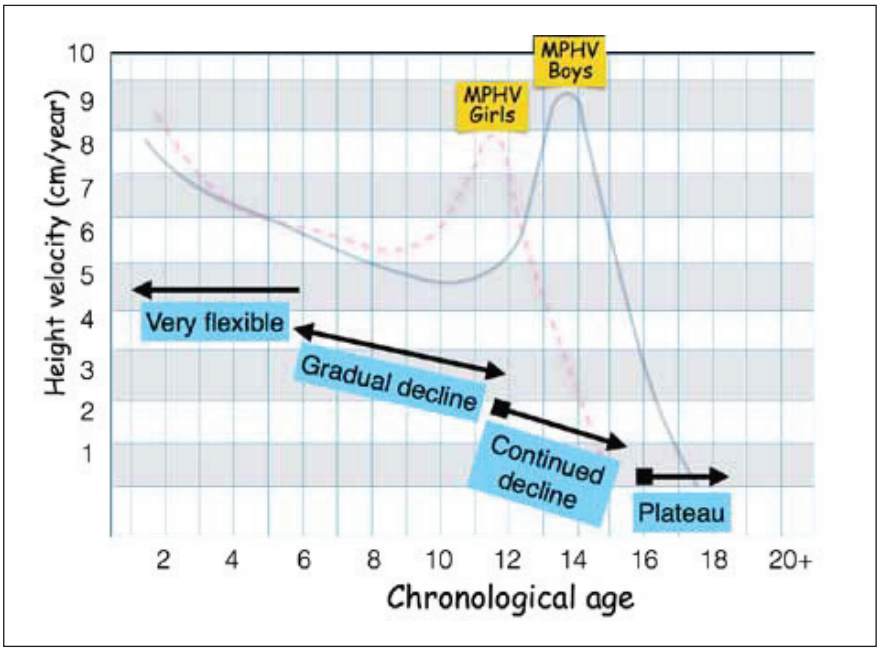

Figure 3: Flexibility of children

Stress relaxation response occurs when the muscle tendon unit that is under constant stress loses its ability to resist the stretch and slowly increases in length. This is referred to as muscle "creep" that results in progressive deformation of the muscle tendon unit when a constant load is applied over time. It allows soft tissues to tolerate applied loads by lengthening and is thought to prevent the muscle from tearing when it is under prolonged tension.

Gate control theory proposes that a combination of the pain and pressure from the stretch simultaneously activates the respective receptors. Pressure signals move to the spine before the pain signals. First the muscle is stretched beyond its active ROM. At this point the athlete is told to resist this stretch, while the targeted muscle is stretched even further. The athlete's resistance against the stretch produces a large force in the elongated muscle that stimulates activation of the Golgi tendon unit to inhibit the force and prevent injury. Over time the Golgi tendon organ adapts and decreases inhibition, allowing the muscle to produce a greater amount of force. However, this may increase the risk of injury.

Research indicates that PNF stretching does not increase flexibility any more than static stretching does. Using athletes to passively stretch each other is not recommended unless the they have been trained and understand the risks of incorrect or high-force stretches.

THE EFFECT OF STRETCHING ON A MUSCLE

If nothing else, stretching feels good. Even animals love to stretch.

Apart from feeling good, stretching appears to improve joint range of motion. However, how this happens is not entirely clear. Various theories have been proposed. One theory with promise proposes that stretching does not increase the length of a muscle, but rather alters tolerance to the discomfort associated with a muscle stretch. In essence, stretching is a strategy for introducing the brain to a new muscle length. The intent is to entice the brain into recognizing that the increased range of motion is safe so it does not stimulate pain signals to limit the stretch.

An often ignored detail is the effect that stretching may have on other structural components of the joint capsule like ligaments and cartilage. Force stretching can cause injury to the fascia that weaves through the muscle and extends into the body's ligaments and tendons. Fascia and connective tissue have a low extensibility. After a stretch fascia and connective tissue generally return to their original length. If stretched too far they are damaged. For this reason, athletes who overemphasize flexibility can have hypermobile joints and degeneration in the articulating surfaces of a joint. Fascia needs to be quite "stiff" and "resilient" so stretching this tissue is not beneficial.

A method for ensuring a safe range of motion for a muscle is to stretch it without using excessive force. If force is used to pull into a stretch then this moves the stretch outside the ability of the brain to control the stretch. The athlete must use his/her own muscle strength to move into and out of the stretch. In essence, it appears that the static-active method is the safest method to use for static stretching.

Static stretching has traditionally been a key component of a warm-up. A traditional warm-up typically consists of a sub-maximal aerobic component, such as slow jogging or cycling, to raise body temperature to increase nerve conduction velocity, enzymatic activity and muscle compliance. This is followed by 10 minutes or so of static stretching, and then by a series of dynamic movements similar to those of the sport and serves as a form of skill rehearsal.

The overwhelming evidence is that static stretching during a warm-up routine has no significant effect on performance and can, in fact, impair subsequent performance. Dynamic stretching, on the other hand, has been shown to increase subsequent power output. For this reason, dynamic stretching using movements similar to those occurring in the sport is recommended as a replacement for static stretching during a warm-up. A better place to use static stretching is during the cool-down period after exercise.

CURRENT POSITION STATEMENT

In 2006 the European College of Sports Sciences examined the relevance of the flexibility claims for sports performance. Here is a summary of their conclusions.

Claim: Passive stretching causes elongation of a muscle.

- **Reality:** During passive static stretching stress relaxation occurs. However, this mechanical effect appears to rapidly disappear within minutes.

Claim: Stretching reduces injury risk.

- **Reality:** The available evidence does not support the notion that stretching before exercise reduces injury risk.

Claim: Static stretching reduces power.

- **Reality:** The evidence suggests that an acute bout of static stretching decreases maximal muscle efforts, including jump performance, when these are performed immediately after an acute bout of stretching. The mechanism for the reduction in performance after static stretching remains unknown. The effect of stretching on running speed has also been investigated, and these published studies report either no effect or a negative effect on running speed.

Claim: Habitual stretching improves running economy.

- **Reality:** Habitual stretching is unlikely to improve running economy. Indeed, muscle "tightness" is associated with greater economy of movement, and not vice versa.

KEY POINTS

1. There are three main applications of flexibility in sports
   - High amplitude of movement
   - Increase time for force application
   - Hold exaggerate postures

2. Three strategies for performing ROM
   - Joint compensation
   - Static-active
   - Static-passive

3. Three varieties of stretching
   - Static
   - Dynamic
   - Pre-contraction

4. Effect of stretching on a muscle is a nervous system phenomenon

CHAPTER 15 QUIZ

1. There are three main applications of flexibility in performing sports skills. Which of the following is NOT one of these applications?
   a) To permit high amplitude of movement in conjunction with high speed
   b) To increase time of force application for producing power
   c) To hold an exaggerated position
   d) To help the heart pump blood through the muscles

2. If the athlete lacks the necessary joint range of motion to attain a desired posture, the athlete's body will recruit the necessary range of motion from alternative joints. This is known as
   a) Joint compensation
   b) Static-active method
   c) Joint recruitment
   d) Static-passive

3. This type of flexibility is needed to assume extended positions and then maintain them using body weight, or the support of the limbs.
   a) Joint compensation
   b) Static-active method
   c) Joint recruitment
   d) Static-passive

4. Pre-contraction stretching is known in the clinical setting as proprioceptive neuromuscular facilitation (PNF).
   a) True
   b) False

5. Forced stretching can cause injury to the fascia that weaves through the muscle and extends into the body's ligaments and tendons.
   a) True
   b) False

COMING UP NEXT

Now it is time for you to become an amazing coach.

Enjoy your journey!

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RUNNING AROUND THE MENSTRUAL CYCLE

Exercise physiologist/running coach Jason Karp is a frequent contributor to these pages. This is an excerpt from the 2012 book, *Running For Women*, by Karp and Dr. Carolyn S. Smith.

BY JASON KARP & CAROLYN S. SMITH

The menstrual cycle, which occurs monthly from menarche (age 11-14) until menopause (age 45-50), is the defining physiological characteristic of females. The levels of the four hormonal markers of the menstrual cycle—estrogen, progesterone, follicle stimulating hormone, and luteinizing hormone—change continuously throughout the cycle as a complex interaction of positive and negative feedback mechanisms regulate the timing and amount of hormone secretion. With the large fluctuations in the concentrations of these hormones, the phase of the menstrual cycle significantly affects the female runner's hormonal environment and therefore her physiology. Indeed, many physiological aspects are affected by the phase of the menstrual cycle, including oxygen consumption, body temperature, hydration, and metabolism, as the sex hormones rise and fall, suggesting that the menstrual cycle affects how women will respond and adapt to training.

PHASES OF THE MENSTRUAL CYCLE

The menstrual cycle is usually 28 days and is divided in half by ovulation on day 14, as the ovum is released from the ovary. The first half of the cycle is the follicular phase and the second half is the luteal phase. The exact length of the menstrual cycle can vary from woman to woman, cycle to cycle, and year to year. Changes in hormone levels can affect the length of the cycle. Teenagers tend to have low or changing progesterone levels, which can alter cycle length. Birth control pills, low body fat, weight loss, being overweight, stress, or intense exercise can also change menstrual cycle length.

FOLLICULAR PHASE

The follicular phase of the menstrual cycle, which begins with the onset of menses (the "period"), typically lasts 14 days (but can last 11-21 days). Following menses, which typically lasts three to five days, estrogen rises, peaking on day 14, right before ovulation. The burst of estrogen toward the end of the follicular phase causes a surge in

luteinizing hormone on day 15 to initiate ovulation. During the follicular phase, progesterone level remains low.

LUTEAL PHASE

During the luteal phase of the menstrual cycle, which always lasts 14 days, progesterone rises. Estrogen drops after ovulation before rising again toward the middle of the phase. The increase in progesterone causes body temperature to increase to prepare for the fertilization of an egg. If fertilization does not occur, both estrogen and progesterone levels decrease abruptly. The luteal phase ends with the onset of menses, and the cycle starts all over again.

When your athletes feel bloated during their periods, they can blame progesterone. The high concentration of progesterone during the luteal phase affects fluid balance, causing them to lose water and electrolytes. The rapid drop in progesterone as they transition from the luteal phase back to the follicular phase results in excess premenstrual water and electrolyte retention, causing them to feel bloated.

PREMENSTRUAL SYNDROME

Premenstrual syndrome (PMS), that often sensationalized cyclic condition that causes women emotional distress and makes men run for cover, is a variety of physical and/or psychological and emotional symptoms that occur toward the end of the luteal phase in the days leading up to menses. Many women of reproductive age experience PMS. Interestingly, the incidence of PMS is higher among separated and divorced women than among married or single women. Hormonally, PMS is characterized by a rapid drop in both estrogen and progesterone. The most common symptoms are headache, breast swelling and tenderness, cramping, bloating, fatigue, depression, and irritability.

INTENSE EXERCISE PERFORMED ON A REGULAR BASIS, ESPECIALLY RUNNING, IS PSYCHOLOGICALLY BENEFICIAL FOR WOMEN, AS IT REDUCES TENSION AND INCREASES PSYCHOLOGICAL WELL-BEING

The specific cause of PMS is not known, although a number of theories exist, including progesterone deficiency, progesterone withdrawal, excessive amounts of estrogen, estrogen withdrawal, changes in the estrogen-to-progesterone ratio, changes in prolactin levels, a drop in the level of endorphins, and psychological issues.

Cramping, one of the more difficult menstrual issues for the female runner, is thought to be due to an increase in prostaglandin, a hormone produced by the uterus that causes the uterus to contract. Birth control pills and over-the-counter anti-inflammatory drugs, such as ibuprofen or naproxen sodium, can reduce the severity of cramps by inhibiting the release of prostaglandin.

Premenstrual irritability may be related to a high estrogen-to-progesterone ratio and premenstrual depression to a low ratio, however research has been unable to document specific changes in the hormone levels in relation to the appearance of PMS symptoms. Breast tenderness may be due to an increase in prolactin, a hormone secreted by the pituitary glands. PMS symptoms may worsen when runners experience major hormonal changes, such that occur during pregnancy, immediately following childbirth, miscarriage, or when taking oral contraceptives.

While there's not a lot of research on the effects of exercise on PMS, the research that has been done has shown that exercise reduces its symptoms. Research examining the effects of exercise on mood has generally found that intense exercise performed on a regular basis, especially running, is psychologically beneficial for women, as it reduces tension and increases psychological well-being. However, there will always be some women for whom exercise is ineffective at alleviating the effects of premenstrual mood swings.

MENSTRUAL IRREGULARITIES

Many female runners who train hard and train a lot who have a low body fat percentage often experience irregular or even absent menstrual cycles, which reduces estrogen levels. Women who start training before menarche delay their menstruation for almost a year, compared to women who already have menstrual periods when they start training. In other words, training, especially intense training, can cause a delay in menarche for up to a year. Once menstrual activity commences, its continued occurrence is also sensitive to training. In response to heavy training, the first change in menstrual cycle activity

is a shortening of the luteal phase, followed by cycles without ovulation and, finally, cessation of menses called amenorrhea. Amenorrhea (defined as 0 to 3 periods per year) results in constant low levels of estrogen and progesterone. A female runner with amenorrhea has about one third the estrogen concentration and about 10 to 20 percent the progesterone concentration of a normal menstruating woman. Thus, endocrinologically, the amenorrheic female runner experiences an estrogen-deficient state similar to that of a post-menopausal woman.

The incidence of menstrual irregularity or amenorrhea is variable—some female runners can train with high volumes and never disrupt or lose their menstrual cycle activity, while some women notice changes in cycle activity with relatively little training. High training volumes, low body weight, and endurance sports like distance running increase the incidence of menstrual irregularities. Long distance runners in particular are at an increased risk for menstrual irregularity or amenorrhea. Inadequate caloric intake to match caloric expenditure, rather than the stress of exercise, is responsible for the loss of menstrual activity. Consuming more calories to compensate for the large caloric expenditure from running can prevent amenorrhea. Therefore, if your athletes run a lot, they need to increase how many calories they consume throughout the day to keep up with the large number of calories they expend by running.

One of the biggest ramifications of menstrual irregularity or amenorrhea is its effect on your athletes' bones. Any disruption to the menstrual cycle can cause a decrease in their bone mineral density, increasing the risk for osteoporosis and stress fractures. Estrogen is extremely important in facilitating the absorption of calcium into bones. Female distance runners with irregular or absent menstruation have significantly lower bone density than those with regular menstruation and even compared to non-athletes. Furthermore, there is a significant loss in bone density, particularly at the lumbar spine, in amenorrheic athletes. A female runner with irregular menstrual cycles runs the risk of decreasing bone mineral density to such an extent that stress fractures occur with only minimal impact to the bones.

Along with the other two characteristics of the female athlete triad—osteoporosis and disordered eating—menstrual irregularities greatly increase a female runner's risk for stress fractures. Therefore, if you coach a team of female runners who are at risk for menstrual irregularities, the runners' bone density should be checked on a regular basis and you must take extra care in planning their training program so they do not increase their running volume or intensity too quickly, and they may need to increase their dietary intake of calcium and vitamin D to protect their bones.

PHYSIOLOGICAL EFFECTS AND PERFORMANCE IMPLICATIONS OF THE MENSTRUAL CYCLE

While a man's hormonal environment is pretty stable, a woman's hormonal environment is constantly changing. Any physiological changes resulting from menstrual cycle-induced fluctuations in estrogen and progesterone are exacerbated during exercise, especially if it's intense. When your athletes go for a hard run, the concentrations of estrogen and progesterone in their blood increase during both the follicular and luteal phases of the menstrual cycle. Low-intensity exercise, however, does not alter the concentrations of these hormones.

BODY TEMPERATURE

Body temperature changes rhythmically throughout the menstrual cycle, peaking during the luteal phase in response to the surge in progesterone. Progesterone acts on the brain's hypothalamus (the temperature control center), which increases set-point temperature. A higher body temperature increases the threshold for dissipation of heat. In other words, a woman's body must reach a higher temperature before her thermostat compensates and begins to cool itself. Not a good thing when your athletes are running on a hot and humid day, as they want to begin the cooling response as soon as they can. Estrogen has the opposite effect on the hypothalamus, decreasing body temperature, which explains why body temperature is lower during the estrogen-dominant follicular phase.

A FEMALE RUNNER WITH IRREGULAR MENSTRUAL CYCLES RUNS THE RISK OF DECREASING BONE MINERAL DENSITY TO SUCH AN EXTENT THAT STRESS FRACTURES OCCUR WITH ONLY MINIMAL IMPACT TO THE BONES.

The increased body temperature

during the luteal phase remains elevated during exercise and when exercising in the heat. A higher body temperature during the luteal phase makes it harder to run in the heat during this phase, as runners don't begin sweating to dissipate heat until they have reached a higher body temperature. They also have a decreased ability to dilate the small blood vessels under the skin, which compromises their ability to release heat to the environment.

Hyperthermia—an increased body temperature—is one of the factors that cause fatigue during prolonged exercise. Thus, long, intense workouts and races in the heat, such as a 10,000 meters on the track (and half-marathons and marathons for the general public), can be more difficult during the luteal phase of the menstrual cycle. The increased body temperature during the luteal phase can also put a runner at an increased risk of developing heat illnesses like heat exhaustion and heat stroke. Training improves a runner's ability to regulate body temperature.

METABOLISM AND MUSCLE GLYCOGEN

Menstrual phase variations in running performance may largely be a consequence of changes to exercise metabolism stimulated by the fluctuations in estrogen and progesterone concentrations. The magnitude of increase in these hormones between menstrual phases and the ratio of estrogen to progesterone concentration appear to be important factors determining an effect on metabolism. The research suggests that estrogen may improve endurance performance by altering carbohydrate, fat, and protein metabolism, with progesterone often acting antagonistically to estrogen. Estrogen promotes both the availability of glucose and uptake of glucose into slow-twitch muscle fibers, providing the fuel of choice during short duration exercise.

The ability to run for a long time is greatly influenced by the amount of glycogen stored in your skeletal muscles, with fatigue coinciding with glycogen depletion. Research comparing the amount of muscle glycogen in women eating either a normal diet (2.4 grams of carbohydrate per pound of body weight per day) for three days or a high carbohydrate diet (3.8 grams of carbohydrate per pound of body weight per day) for three days has shown that muscle glycogen content is greatest during the mid-luteal phase after both normal and high carbohydrate diets. Muscle glycogen is lowest during the mid-follicular phase. However, a female runner can increase the amount of muscle glycogen in the follicular phase by eating a high carbohydrate diet. There is also a glycogen-sparing effect to the luteal phase, with a greater reliance on fat during submaximal exercise.

Another ramification of the altered metabolism is the possible delay of fatigue during submaximal exercise. Theoretically, with less reliance on carbohydrate for energy, less lactate (and therefore other metabolic by-products) is produced. Some studies have documented that less lactate is indeed produced during exercise in the mid-luteal phase, while other studies have not. Interestingly, when men are given a synthetic version of progesterone, they produce less lactate during maximal exercise, suggesting that progesterone, which is elevated during the luteal phase, may lower lactate levels.

BREATHING

Progesterone stimulates ventilation independent of the intensity of a run, which can increase a runner's perception of effort since runners typically link their perception of effort to how much they're breathing. Thus, breathing is greater during the luteal phase, when progesterone concentration is highest. Thus, a female runner may feel more winded during her luteal phase workouts compared to her follicular phase workouts.

The increased breathing during the luteal phase may also increase the oxygen demand of breathing itself since the muscles responsible for breathing need oxygen to work just like the leg muscles do. More oxygen being used by the breathing muscles means less oxygen available to the leg muscles. The increased breathing could hypothetically reduce running economy since a runner will consume more oxygen to support the extra breathing. Most research, however, has not documented a change in running economy across the menstrual cycle.

Lung function after exercise is also affected by the phase of the menstrual cycle, with women having more trouble breathing during the luteal phase. This has huge implications for runners with asthma, since exercise is a powerful trigger of asthma symptoms. Thus, the declining lung function in the luteal phase can negatively impact training and competition strategies in an asthmatic runner. Females with asthma experience a worsening of asthma symptoms and increased bronchodilator use during the mid-luteal phase. Interestingly, lung function and asthma symptoms seem to vary cyclically. Thirty-three

to 52 percent of asthmatic women report a premenstrual worsening of asthma symptoms, and an additional 22 percent report that their asthma is worse during their periods.

BLEEDING

If your athletes bleed a lot during menstruation, it's possible that their blood's hemoglobin concentration may decrease, which can negatively impact their ability to transport oxygen in their blood. Since iron is an important component of hemoglobin, iron loss often accompanies a lot of bleeding. If this happens, your athletes may need to supplement their normal diet with iron. Many female runners exhibit athletic anemia (low blood iron levels due to physical activity), especially if they lose a lot of blood during menstruation. Athletic anemia is very common among female runners, especially those training at altitude.

ENDURANCE PERFORMANCE

The documented effects of the menstrual cycle on physiological characteristics is one thing; how they influence your running performance on Saturday is quite another. As with most of the research on the menstrual cycle, the research on how it affects endurance performance is not totally clear. Survey-based research has shown that many female athletes do not report any noticeable detriment in performance between phases of the menstrual cycle. However, many others report an improvement in performance during menstruation. The best performances have generally been reported to occur in the immediate post-menstrual days with the worst performances occurring during the pre-menstrual interval and the first few days of menstruation. However, this type of survey-based research needs to be interpreted with caution, since there are many confounding variables surrounding the menstrual cycle, the perception of exercise effort, and women's inherent bias about the menstrual cycle, especially the premenstrual days.

SOME RESEARCH HAS SHOWN THAT RUNNERS CONSUME LESS OXYGEN WHILE RUNNING AT SUBMAXIMAL SPEEDS (I.E., THEIR RUNNING ECONOMY IS IMPROVED) WHEN TAKING ORAL CONTRACEPTIVES.

Research that has actually measured performance in women is also conflicting, with some studies showing that performance is influenced by the menstrual cycle and other studies showing that it is not. While theoretically and often anecdotally endurance performance may be better in the mid-luteal phase compared to the early follicular phase, it may only be so when the ratio of estrogen to progesterone is high in the mid-luteal phase (remember that both estrogen and progesterone are elevated in the mid-luteal phase). An improved performance also tends to occur in the late follicular phase, which is characterized by the pre-ovulatory surge in estrogen and suppressed progesterone. It seems that a female runner can expect to perform better during times of the menstrual cycle when estrogen is the dominant hormone and perform the worst when progesterone is the dominant hormone.

Anecdotally, many of the female runners I've coached have experienced their worst training days in the few days leading up to and including menstruation. How your athletes' workouts and races are affected is highly individual. They may find that, while harder workouts may be more challenging during their periods, easy running may actually improve their moods and alleviate physical symptoms associated with their periods.

ORAL CONTRACEPTIVES

Oral contraceptives, which supply a woman with synthetic sex hormones, are the most common form of birth control for women. Oral contraceptives mimic the normal female menstrual cycle by increasing and then subsequently decreasing the concentrations of estrogen and progesterone on a set 28-day schedule leading up to menses. The three different types of oral contraceptives are monophasic, biphasic, and triphasic. Monophasic pills, the most commonly used, provide fixed doses of estrogen and progesterone over 21 days, followed by seven days of placebo. These pills regulate the hormonal environment, decreasing hormonal fluctuations across the cycle, which can provide a controlled environment for the runner and minimize potential variations in physiological variables. Biphasic pills switch the dosage of the hormones once during the 21-day cycle. Triphasic pills supply three different doses of estrogen that are increased throughout the cycle. Oral contraceptives reduce the natural production of estrogen, progesterone, luteinizing hormone, and follicle stimulating hormone, which inhibits ovulation and prevents pregnancy.

In addition to preventing pregnancy, oral contraceptives force a regular 28-day cycle, which makes it easier to plan your athletes' training and races. Some research has shown that runners consume less oxygen while running at submaximal speeds (i.e., their running economy is improved) when taking oral contraceptives. However, both the maximum ability to consume oxygen (VO_2max) and running performance do not seem to be affected.

Because oral contraceptives supply estrogen, it's possible, at least theoretically, that they can reduce the risk for bone injuries associated with menstrual irregularities by increasing bone mineral density. However, research examining the effects of supplemental estrogen provided by birth control medication on bone mineral density has shown mixed results. Some studies have shown that it has no effect, some studies have shown an increased bone mineral density, and still other studies have shown a decreased bone mineral density, especially when contraceptives are taken during late adolescence or early adulthood.

In women with normal menstrual cycle activity, oral contraceptive use does not seem to confer any benefit to bones. In other words, if your athletes have normal menstrual cycles, their estrogen level is already adequate to protect their bones; supplying more estrogen from a pill is not going to make their bones any stronger. Any benefit to bones seems to be specific to active women with menstrual irregularities who have compromised skeletal health.

One of the possible side effects of oral contraceptives that can affect your athletes' running is the potential to gain weight. Studies on physically active women have found that oral contraceptives, when taken either as a single, fixed dose of estrogen or as multiple doses over the menstrual cycle, increase body mass and percent body fat. But the weight gain doesn't seem to be permanent and can return to what it was once they stop taking the pill.

Another side effect of oral contraceptives is a progesterone-mediated increase in body temperature, much like that which occurs during the luteal phase of the menstrual cycle. Since temperature regulation is an important factor in long races, the increased set-point body temperature from oral contraceptives can affect a runner's ability to run in the heat.

TRAINING CONSIDERATIONS

Since estrogen has such a big effect on bone health, one thing to consider during the aerobic base building phase of your athletes' training is the time of the month that they increase their mileage. Try not to increase their weekly mileage during menses or the early part of the follicular phase and the latter part of the luteal phase of the menstrual cycle, as those are times of the month when estrogen concentration is low. Conversely, good times of the month to increase weekly mileage are during the latter part of the follicular phase and the mid-luteal phase, when estrogen concentration is high.

Avoid challenging workouts around menses, especially if your athletes don't feel well at that time or if they feel bloated due to the rapid drop in progesterone as they transition from the luteal phase to the follicular phase. For example, if a runner has a 28-day cycle starting on Monday, and menses occurs on days 1 to 3 (Monday to Wednesday), plan their hard workout on Thursday or Friday that week. If you have two workouts planned, schedule them on Thursday and Saturday, or schedule just one workout the week of menses and two workouts during the other three weeks of their cycle. If menses lasts five days (Monday to Friday), schedule one workout the week of menses and two workouts during the other three weeks of their cycle. For those lucky runners who are not adversely affected by their periods and don't experience much discomfort, it's okay to do the workouts and see how they respond.

GOOD TIMES OF THE MONTH TO INCREASE WEEKLY MILEAGE ARE DURING THE LATTER PART OF THE FOLLICULAR PHASE AND THE MID-LUTEAL PHASE, WHEN ESTROGEN CONCENTRATION IS HIGH.

RACING DURING THE MENSTRUAL CYCLE

Racing across the menstrual cycle is a complicated matter. Although a number of studies have found endurance performance to vary between phases of the menstrual cycle, there is an equal number of studies that have shown no difference in endurance performance between phases. Menstrual phase variations in endurance performance may largely be a consequence of changes

to exercise metabolism that are stimulated by the fluctuations in the concentrations of estrogen and progesterone. Anecdotally, many women claim that they don't run well in the few days surrounding their periods. If any of your athletes have ever run a race during "that time of the month," they know how bad an experience that can be. It's pretty clear that they should try to avoid racing during their periods. The amount of menstrual flow, and therefore the amount of blood and iron they lose, also affects how they feel the week following their periods. Women who bleed a lot may feel sluggish following their periods, which would make that a difficult time to race.

If endurance performance is indeed better at certain times of the month, it seems that, in general, it is better during the late follicular phase of the menstrual cycle prior to ovulation, which is characterized by the pre-ovulatory surge in estrogen and suppressed progesterone concentrations. Performance may also be better during the middle part of the luteal phase (a week after ovulation), which is also characterized by rising estrogen accompanying a high level of progesterone. Since progesterone exerts some negative influences on body temperature, fluid balance, and breathing, endurance performance may only be improved in the mid-luteal phase compared with the follicular phase when the ratio of estrogen to progesterone is high (i.e., the increase in estrogen concentration is high relative to the increase in progesterone concentration so the effects of the rising estrogen outweigh the effects of the rising progesterone).

Initial Level 1 Recertification Deadline Approaching, December 31, 2016

The initial recertification period for Level 1 coaches, implemented with the introduction of the revised Level 1 curriculum is quickly approaching. All coaches certified prior to January 1, 2013 and not holding a Level 2 certification will need to choose from one of two recertification options to maintain their Level 1 certification. Both options include obtaining a passing score on the revised Level 1 exam.

Level 1 coaches who fail to recertify by December 31, 2016 will be removed from the USATF Coaching Education database and will not be eligible to participate in the Level 2 event specific course until a new Level 1 course is completed. Recertification also assures a Level 1 coach of available cutting-edge information at the end of each Olympiad to keep their certification current.

Learn more about Level 1 Recertification options and the revised curriculum here.

2016 Calendar of Schools

Level 1

Date	*Location*
Nov. 5-6	Nazareth College – Rochester, NY
Nov. 12-13	Cardinal Stritch University – Milwaukee, WI
Nov. 12-13	Tennessee State University – Nashville, TN
Nov. 18-20	Eastern Michigan University – Ypsilanti, MI
Nov. 18-20	Johnson & Wales University – Denver, CO
Nov. 18-20	Life University – Marietta, GA
Nov. 19-20	Allen High School – Dallas, TX
Nov. 26-27	UNLV – Las Vegas, NV
Nov. 26-27	Residence Inn Kansas City Airport – Kansas City, MO
Dec. 2-4	IMG Academy – Bradenton, FL
Dec. 9-11	Westerville South High School – Westerville, OH
Dec. 10-11	Houston Baptist University – Houston, TX
Dec. 16-18	Public School 9 – New York, NY
Dec. 17-18	Fresno State University – Fresno, CA

2016 USATF Annual Meeting Schedule of Coaching Activities & Meetings

Wednesday, November 30

	Committee	*Detail*
9:00 AM – 5:45 PM	Podium Education Project	Hilton Hotel, Walt Disney World
7:45 PM – 8:30 PM	Coaches Education	Executive Committee

Thursday, December 1

	Committee	*Detail*
8:30 AM – 10:50 AM	Coaches Advisory	Executive Committee
11:30 AM – 12:20 PM	Coaches Education	Executive Committee
1:30 PM – 3:00 PM	Coaches Advisory	Executive Committee
2:30 PM – 4:50 PM	Men's/Women's Development	Joint Executive Committee
4:00 PM – 5:50 PM	Coaching Education	General Session

Friday, December 2

	Committee	*Detail*
7:00 AM – 8:30 AM	SafeSport Training Course	-
9:00 AM – 10:30 AM	Coaches Advisory	General Session
12:00 PM – 2:50 PM	Men's/Women's Development	Joint General Session
1:00 PM – 1:50 PM	Coaching Education	Executive Committee
4:00 PM – 5:50 PM	Men's Track & Field	General Session
4:00 PM – 6:50 PM	Women's Track & Field	General Session
7:00 PM – 8:30 PM	SafeSport Training Course	-

2016 PODIUM EDUCATION PROJECT

Celebrating 31 Olympic Medalist Coaches and USATF High Performance Program

Wednesday, November 30, 2016
Hilton Hotel, Walt Disney World, Orlando, Florida

What is it: The Podium Education Project (PEP) is an annual High Performance symposium that brings together coaches and sport scientists to review and present cutting-edge methodology and coaching practices. An event where the best of the best convene, the PEP provides an exchange of knowledge between scientists, elite coaches and podium level coaches who have achieved the status of developing a medal-winning athlete at the highest level (National Championships, Youth Olympics, World Championships, Pan American Games and the Olympic Games).

Who should attend this symposium: Coaches seeking to advance their knowledge at the highest level of the sport, sport scientists and academics who are interested in cutting-edge information on human performance. Youth Coaches and high school coaches who are developing USATF's future stars.

Featured international speakers and clinicians scheduled to speak to date:

- **Don Babbitt:** Associate head coach at the University of Georgia, Coach Babbitt is considered the top throws coach in the U.S., having directed gold medalists Adam Nelson and Reese Hoffa in their successful throws career.
- **Anatoliy Bondarchuk:** The most accomplished hammer thrower of all time, having set two world records before becoming a world-class coach. Currently resides in British Columbia, Canada leading such world class throwers as Canadian Dylan Armstrong and Jennifer Joyce, as well as two-time U.S. Olympian, Kibwe Johnson.
- **Renato Canova:** Known worldwide for his 20+ year coaching career with many of Kenya's top marathon runners, including 2016 Berlin Marathon winner, Kenenisa Bekele.
- **Gunter Lange:** Senior Associate Director of IAAF Development Program, who oversees the IAAF Coach Certification program, and is an endurance expert in the sport sciences.
- **Duffy Mahoney:** USATF Chief of High Performance presents the new 2020 High Performance plan to assure that Team USA continues their dominance in track and field as the world's #1 team.
- **Inigo Mujika:** World renowned Spanish lecturer and professor on exercise physiology, best known for his research on recovery and tapering in training. While specializing in cutting-edge research for endurance sports, his book, "Endurance Training-Science and Practice" has been acclaimed in all areas of sport.
- **Rana Reider:** The most successful horizontal jumps coach in the U.S., mentoring two-time Olympic triple jump gold medalist Christian Taylor, as well as 2016 Olympic gold medalist Tianna Bartoletta.
- **Loren Seagrave:** Director of track and field at the prestigious IMG Academy in Florida, Coach Seagrave has a 30-year coaching career of producing top talent in the sprints, hurdles, and jumps. He coached elite athletes, such as long jumper Dwight Phillips, to multiple medals at the World Championships and Olympics.

Registration: Click here to register and for more information.

IAAF/USATF Academy for Jumps or Youth Specialization

December 4-10, 2016
IMG Academy - Bradenton, Florida

Offering: Upon completion of the USATF/IAAF Academy, coaches will receive an IAAF Level V diploma and USATF Level 3 certification. The IAAF Academy Diploma for Elite Coach is the highest recognized achievement awarded through the IAAF Coaches Education and Certification System (CECS). It is recognized around the world and indicates that a coach is not only highly experienced but has the knowledge to coach or instruct at the highest international levels of the track & field profession. In addition to the IAAF Diploma, all USATF Level 2 coaches who complete the course will receive a Level 3 certification in their selected event, which is the highest coaching honor in the US. The school is a six-day intensive classroom and laboratory setting.

For more information and faculty bios, click here.

***NEW* Youth Specialization Academy**:

USATF and IAAF are partnering to offer the Youth Specialization Academy, designed to introduce all coaches to the best research and practices for specializing in coaching youth athletes. Utilizing a long-term athlete development model for coaching youth through elite, the specialization academy will include topics in the following:

- Growth and Development Cycles for the Developing Athlete
- Physiology of the Developing Athlete: Skeletal and Muscular
- Stages of Mental and Emotional Growth
- Training Theory for the major event areas based on age appropriate progressions
- Talent Identification
- Coaching Ethics and Modeling for the Developing Athletes
- Blending the Support Team and the Coach: at the high school meet or at the Youth Olympics
- Strength Training; When, How much, Who
- Basic skills and Drill Progression in the Broad Events

IAAF Academy Application: Click on the application link below and submit with complete resume to Terry Crawford, Director of Coaching: terry.crawford@usatf.org. Application deadline is **November 8 or when the academy reaches maximum capacity**. Academy is expected to reach capacity quickly, so it is recommended that interested coaches apply early.

Click here to download the application

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