techniques

for Track & Field and Cross Country

VOLUME 11, NUMBER 2
NOVEMBER 2017

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OPTIMIZING RHYTHMIC MOTOR PATTERNS

+

COMMONALITIES AMONG THE THROWS

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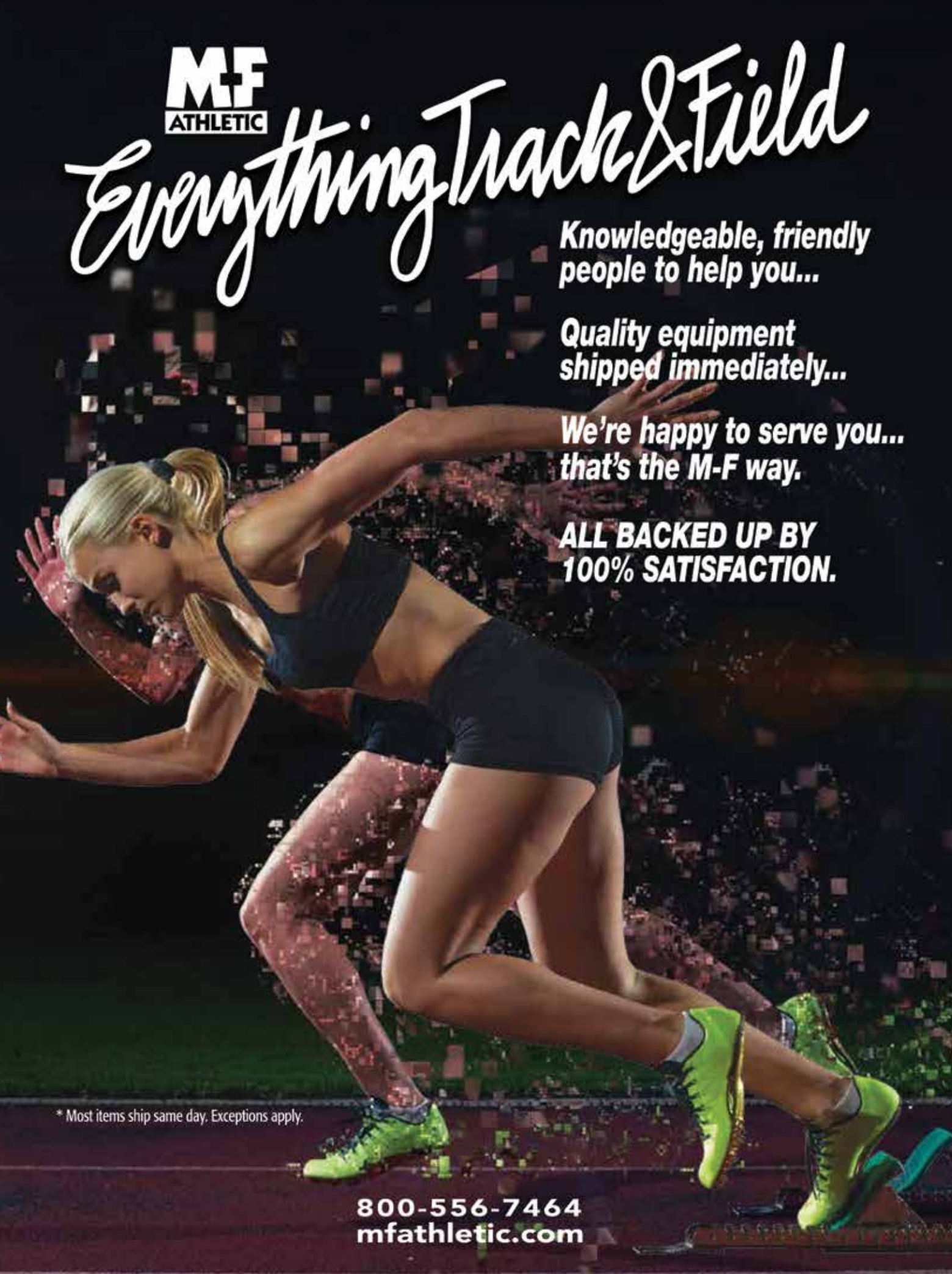
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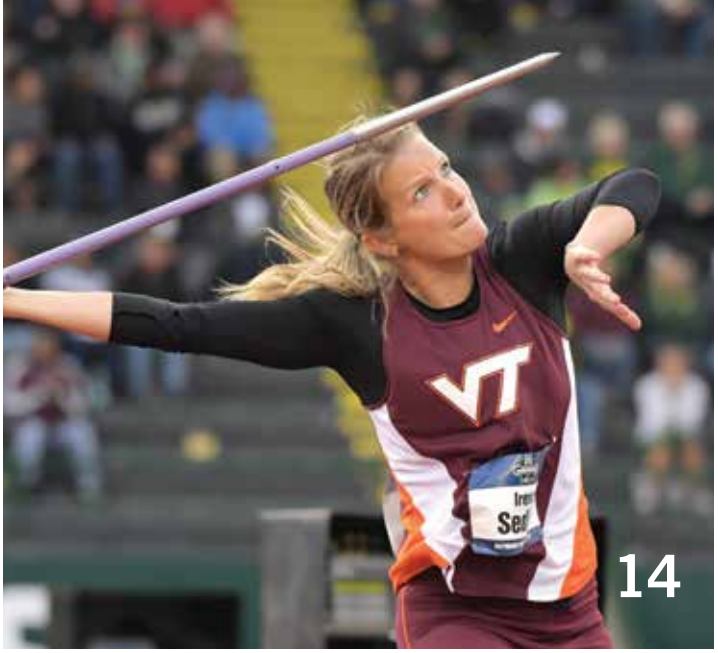

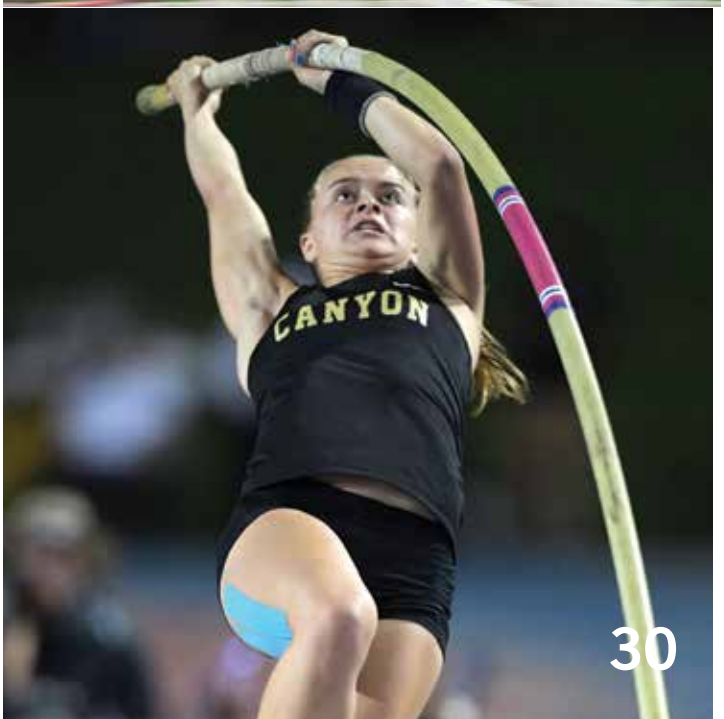

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Photograph courtesy of University of Tennessee Athletics

A LETTER FROM THE PRESIDENT

As the cross country season reaches its championships segment, the 2017 USTFCCCA Convention is right on the horizon. I hope each of you will be able to join your colleagues in Phoenix, Arizona for four days of professional development, networking, and working together in a deliberative body to better our sports.

As we do each year, we are proud to induct another fantastic group of coaches into our Hall of Fame during the 2017 Convention. This year's inductees are Amy Deem, Pete Farwell, Jack Hazen, Bob Kersee, Fred Samara, and Patrick Shane. The hard work, dedication, and perseverance of these coaches serve as an inspiration of all of us in our own pursuit of excellence in our coaching careers. We also look forward to awarding the 2017 men's and women's winners of The Bowerman, recognizing our National High School Cross Country and Track & Field Coaches of the Year, and honoring our schools that earned Program of the Year in each of our respective divisions. I know we all look forward to these opportunities to celebrate the achievements of our peers and colleagues.

The Convention also serves an important role in the shaping of the future of our sports. We meet together to listen to and learn from each other, allowing our own perceptions and preconceptions to be shaped by the experience and wisdom of our colleagues, and sharing our own experience and wisdom with others. While the process is sometimes messy, if we approach our deliberations with respect for each other and an open mind to consider alternative viewpoints, this foundation will help us achieve the best possible results on whatever questions we consider.

Our Convention also offers us a great venue to interact with the vendors that support our organization throughout the year. Whether it's new equipment, a new facility, training aids, recruiting assistance, or uniforms, our sponsors and supporters will be glad to talk to you about how they can meet the needs of your team. Please take some time during the Convention to stop by our vendor booths and see what great products and services each of these companies has to offer.

As my predecessor Damon Martin did last year, I want to appeal to each of you to get involved in our coaches association. This association belongs to all of us, and we need your involvement and your input in this important work. Each of our divisions has a number of committees that work throughout the year on behalf of coaches in our sports. If you'd like to get involved, please take some time before or during the Convention to contact your sport's officers to let them know of your interest.

Finally I would like to express my sincere condolences to the family of George Dales who passed away on September 27 at the age of 96. As most of you know, George was a tireless proponent of cross country and track and field for decades. His contributions to our sports extend well beyond the realm of competition; he was a mentor to a countless number of coaches and has left a legacy that will be difficult if not impossible to match.

I wish you all the best in the championships segment of the Cross Country season or in your preparations for the upcoming Indoor Track & Field season! Stay tuned to the USTFCCCA web site for Cross Country Championships coverage and our postseason awards. I hope to see you in a few short weeks in Phoenix!

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SHORT SPRINTING

A WORLD FULL OF RHYTHMIC CONSIDERATIONS

CHRIS PARNO

SPX SPORTS PHOTO

"Rhythms Create Order Among Chaos"; a phrase not only tattooed on my right foot, but a mantra for daily living. I see the world in rhythms, and if you asked my fiancé, the consistent tapping of my hands and feet brings her daily annoyance. Who would have thought the metronome sound of a car blinker could strike up a full-on symphony of beats? This rhythmic passion originated from my early exposure to Drum Corp International (DCI), a mesmerizing display of movement, coordination, hair-raising melodies and overwhelming presentation of what creativity can generate. In middle school, I picked up the marching snare drum and rhythm (drumming) changed my life forever. If you've never seen DCI, I suggest a quick YouTube search of "Backseat Freestyle by Brandon Olander" to see some true Central Nervous System (CNS) magic.

Drumming brought an overhaul for my CNS; I created new motor patterns while organizing and increasing efficiency as I practiced and performed. If you've ever read the *Talent Code* by Daniel Coyle, *Outliers* by Malcolm Gladwell, or *The Sports Gene* by David Epstein, the subject of myelination and purposeful practice are explored. Myelin wraps cells on the axons of motor neurons, speeding up neural activity, bringing improvements within specific movement. One cannot simply be an Olympic sprinter; it takes years of practicing, sequencing, refining and a high genetic ceiling. I have been fortunate to attend rhythm symposiums on hurdling from Marc Mangiocotti and Ralph Lindeman, and recently took a liking to a blog post by Altis coach Andreas Behm titled "Practice Rhythm & Flow." Coach Behm discusses his love for rap music and states; "Rhythm in rap music is inherent from the various elements of the beat (drums, bassline, dubs and snips) to the vocal rhymes timed out in bars and creative delivery of syllables. In track, rhythm is present in such activities as acceleration, synchronous limb movements, hurdle step patterns, discus and hammer rotations ... just to name a few." Coach Behm understands the prevalence of rhythm in the context of track and field. Throughout all of this experience, my interest in track-based rhythms started to blossom.

The prevalence of rhythm in our daily lives goes far beyond the track. Rhythm, tempo and flow are synonymous within many life tasks. If one is stuck on organizing their thoughts in a paper, they make an outline; musicians organize songs in series of choruses, verses and bridges, while teachers create lesson plans to fill class periods. These pathways of organization help create flow and rhythm to the task. On the track, coaches define Key Performance Indicators (KPI) to break down elements of short sprinting, hoping to increase rhythm and flow when the skill is performed. Furthermore, the curriculum designers at NASPE, the National Association of Sports and Physical Education, have advocated rhythm as a foundational skill in physical activity. Rhythm activities are wrapped in contemporary pedagogy of physical education curriculum. While studying to be a physical educator in college, one of my favorite classes was "Teaching Rhythms." The curriculum incorporated rudimentary rhythmic movements like skips and hop progressions and moved to hand-eye coordination activities like lummy sticks and juggling. The goal of this course was to engrain and internalize rhythms at a young age.

How can coaches better utilize rhythms in the daily coaching of short sprinters? The science behind skill acquisition and refinement often leaves me awestruck as our body interacts with the world around it. A quick look into some of the elements of science within rhythm will help get us started.

The nervous system is comprised of the Central Nervous System (brain and spinal cord) and the Peripheral Nervous System (brain to body connection). Within the brain, the cerebrum (directs volitional movement), the basal ganglia (initiates well-coordinated movement), and the cerebellum (storage of learned movements) are the drivers. The personification of these parts of the brain are reminiscent of the movie "Inside Out" where the five emotional characters go through the day-to-day task of controlling the body and storing different memories. Messages from the brain are expressed to the body from the motor cortex and thalamus, which is a sort of "control center" that dictates which muscle will contract in the desired movements. From here the Peripheral Nervous System (PNS) takes the message to the intended target expressing it through physical movement.

When thinking about the PNS, and the messages sent throughout the body, I'm reminded of a book called *Zen and the Art of Motorcycle Maintenance*. The author, Robert M. Pirsig, covers the difference between "classic" vs. "romantic" understanding. Pirsig explains the difference between the two; "The romantic mode is primarily inspirational, imaginative, creative, intuition. Feelings rather than facts predominate…The Classic mode, by contrast, proceeds by reason and by laws – which are themselves underlying forms of thought and behavior." Each year there are signature performances in track and field. The romantic sees the movement and individual limbs coalesce into rhythmic harmony, while the classic would think about the inner workings of the PNS and how the systematic rhythmic movements are wired and transmitted as they are performing. A great example of a track romantic is Guy Drut, I suggest watching his video, "13 Seconds." Guy utilizes limited dialogue while he describes his movements. The few words he uses to explain his technique are "Economy" and "Efficiency." Drut focuses on these primary words as he takes you through hurdle movements with very little technical verbiage throughout the video. Guy is a man truly obsessed with the rhythm of the hurdles.

Taking a deeper look at classic vs. romantic; the "classic view" of the PNS introduces terms like:

1. Motor Units: motor neurons innervate skeletal muscle

2. Afferent and Efferent pathways: sending and receiving messages from the brain to the muscles and back

3. Actin and Myosin proteins: provide the movement portion of muscular contractions

4. Bone and connective tissues that allow and potentially impinge movements

Contrary to the Romantic view, the classics are cut and dry on structural make-ups and messages producing certain movements, considering elements of:

1. Rate Coding, dealing with frequency of producing movements and coordinating those movements at higher speed

2. Myelination of Schwan's cells which assist in speeding up messages sent through the neuron

3. Recruitment, which deals with the amount of fibers contracted and the potential forces that can be produced within movements

The romantics are more concerned with gross motor movements and how the PNS and CNS coordinate messages into world record performances. Some coaches see short sprinting as a systematic set of rigid technical models (classic) while others see it as work of art with the various physiological systems working in symphony (romantics).

With the science and understanding touched on, let's get back to rhythm. The

CNS and PNS create the possibility to talk on this subject, and it's important to know the rules governing how the body orchestrates specific movements within the context of our sport. When I consider how I have coached and think about ways to get my group to the highest level, rhythm always maintains a presence within that process. These thoughts revolve around the origination of motor patterns, the myelination involved in enhancing acceleration, and max velocity motor pattern efficiency. The next section of the article will talk about strategies to involve rhythm into your daily practice plans. We will talk about auditory and visual cueing systems that will assist in developing rhythm.

AUDITORY RHYTHM SYSTEMS

It is not a secret that the landscape of college hallways changed in 2001 when Apple came out with the iPod, allowing for large quantities of music (rhythms) on demand. In 2005, my freshman year of college, I had an iPod Nano that cut me off from the rest of the student body, consistently filling my brain with beats. Fast forward to the present day, Mp3 technology has been integrated into smartphones replacing the iPod. Rhythms, beats, differing time signatures, tempo changes and varying dynamics are a part of students' daily lives. I believe its changing athletes within the sprints/hurdle world. Generally speaking, student-athletes have a higher exposure to rhythm than students circa 2001. I have used this to my advantage. I compare rhythms to track-based movements and capitalize on my student-athletes ability to understand the language of rhythm.

With that being said, I am a proponent of music being present at practice. Some coaches may be adamantly against this, but I have found rhythm can be a subliminal message that creeps into the brain of the athlete trying to perform a skill. Without my athletes knowing, I choose songs in our practice mix tape that have a tempo close to the tempos I'm looking for in the warm-up/sprint drills. Neuromuscular days have a more aggressive beat as the warm-up is specific to the higher intensity nature of the day, while recovery days may have a laid-back beat or melody to try to signify the goal of the session. Although it is not in the forefront, music may help lay a rhythmic foundation for the day.

Various cueing systems are another way rhythm can be integrated within practice sessions. During early season warm-up periods, I take a methodical approach to explaining and teaching each skill within the warm-up. I am careful to pick and choose direct cues that assist in learning the rhythm of an exercise. A straight to the point temporal cue dealing with the time and rhythm of sprint drill is important. For example, the "A-skip" is a fairly prevalent drill. I think of the rhythm of the drill in quarter notes. A vast amount of music is in 4/4 time signatures, with each quarter note getting one beat per measure (think "Billie Jean" by Michael Jackson). In that song, the first few measures have the bass drum and snare drum alternating on each quarter note. Imagine the right knee coming up on the snare hits and the left knee coming up on the bass drum hits…with the alternating shuffle on the back beat of each knee rise. This pattern produces the A-skip with the assistance of a popular song backing the rhythmic make-up of the drill.

Taking this concept a bit further, a coach can add the simple cue "up, up, up, up" on each beat (snare & bass) allowing the athletes to hear the pattern on top of the music. A more advanced athlete could use a rhythm cue that uses an 8th note pattern cuing "up and, up and, up and, up and." It may seem quite rudimentary, but I've had plenty of All-Americans that struggled early on with coordinating sprint drill movements. Coaches can cram a lot of teaching in the warm-up using rhythmic cues, instead of just yelling out "A-Skips" then turning to set up a something for practice as the athletes shuffle along aimlessly. If you hold your warm-ups to a high standard rhythmically, the motor development can carry over to your practice.

SPX SPORTS PHOTO

The acceleration portion of a short sprinting race is highly rhythmic as the body rises to the upright position characteristics of max velocity running. One rhythmic cue for acceleration is comparing the pattern to a slow clap. The beginning patient portion of the clap signifies the increased time spent on the ground as the body creates momentum, while the ending sped-up portion of the clap suggests the body's rise into our mid-race stance/cadence. Unfortunately, just cueing a slow clap won't do a whole lot because the tempo you start the clap at is highly individualized. Start the clap out too fast and the acceleration can be a rushed "wheel spinning" type pattern, conversely, start it off to slow and you may see an over striding, bounding type pattern. Each athlete may click to different temporal cues, but it's also important we do not use rhythmic cues in a detrimental manner!

Coaches hear a lot about specificity of movement within our sport. Each drill and warm-up movement may assist athletes in creating correct and efficient motor patterns. At the elite level (i.e., state championships, NCAA national meets), there are very few athletes that can get away with being completely out of sync rhythmically during a warm-up, but then flawlessly perform a correct acceleration pattern. The rhythmic qualities of the warm up and pre-race routine signify the coordinative abilities and readiness of the CNS system and can be a strong indicator of the rhythmic qualities that the athlete will express during race or practice demands. Correct auditory cues while performing the warm-up, helps create efficiency and economy

within high-powered neuromuscular movement.

VISUAL RHYTHM SYSTEMS

I have always been a visual learner, which is why I started "running school" during our fall general/specific prep phase at Minnesota State. Every Wednesday, we will get together in a classroom and work through different themes within sprinting and hurdling. We breakdown film, talk about biomechanics and how we achieve certain positions in sprinting.

Biomechanical considerations within short sprinting go hand-in-hand with rhythm and timing. Watching a 30m acceleration, or a rep through wickets, requires a high level of rhythmic understanding. Furthermore, a coach must know the individualistic demands of our sport with athletes expressing unique biomechanical markers and timing based on the relationship between the upper and lower lever length (e.g., taller athletes have unique rhythms compared to short athletes that have quicker timing.) During running school, I will show both correct and incorrect versions of sprinting and stress the visual rhythmic patterns needed to perform these movements. The previously covered auditory cues used at practice can be presented during film study to add another layer of support to learning.

Outside of visual or auditory learning, the combination of the two can greatly assist teaching of a skill and implementation of a drill. When instructing a high level skill such as an "in and out", I like to use both sets of cues to assist execution of the timing and rhythm within the drill. If we are performing an 80m in and out, I will have an experienced runner line up in a 3pt start and on my cue start the drill. As the athlete accelerates, the group watches from the side as the demonstration progresses. Using the auditory cues "Accelerate, In, Out, In, Out" as the athlete runs through the zones can assist the less advanced athlete gain a better understanding of the proper execution of the skill. With a primary goal of successful and meaningful efforts through the exercise, the use of a combined visual/auditory cue set can help engrain the timing and rhythm needed to perform the drill.

Another example comes from demonstrating acceleration patterns. If an athlete is having trouble applying pressure through the first 4-6 steps within an acceleration, I may use "push, push, push, push" after initial clearance. This cue signals to the auditory dominant athlete that you want to see pressure applied at each contact, while still allowing the visual learners to see the appropriate technical execution of the initial segment of acceleration. Another common issue within acceleration is an athlete rising too quickly during their initial drive out of the blocks. You can take the same cue from above and elongate it by only saying "push" on every right foot contact to extend the initial drive pattern. Creativity with cues can address athlete's issues and may also uncover other underlying problems within certain movement patterns.

An important aspect to remember is that each coach will need to tailor their cue sets to their different populations of athletes, whether auditory or visual. A cue or cue system is only as good as the results it garners. Using rhythmic considerations to enhance cuing can be an effective strategy to assist athletes progress a skill regardless of the learning style.

CONCLUSION

The classic thinker views complex movements within short sprinting as a purely systematic brain to body, top down approach. No matter how hard you think classically about these movements, a personal best effort in any sprinting event is a work of art and the romantic thinker is always looking at the symphony of the timing and rhythm pattern contributing to those works.

Getting back to the tattoo on my foot from the intro, "Rhythms Create Order Among Chaos" is tattooed on my right foot because that foot is used to control the bass drum in a drum set. When recording music, the drummer is usually the first to lay down tracks as it organizes the rhythm of the song and the other musicians rely on this structure to govern their contributions to the song. Without this foundational rhythm or timing, the music can become chaotic as the members make their way through. The body isn't far from that concept; movement can be chaotic without the governing of efficient and effective rhythms. This is imperative since the environment in which our sport takes place can be chaotic! The Central Nervous System is a rhythmic genius as it organizes the millions of signals we take in and produces efficient and optimal rhythmic motor patterns. Anything we can do as coaches to assist the CNS in producing the motion necessary to achieve a work of art, is imperative. You can always open a book to learn more about the science behind running, however the application of that science is truly where the art of coaching begins.

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THROWS

THE TECHNICAL COMMONALITIES

IMAGE OF SPORT PHOTO

Although there are five different throwing events in track and field, they share some things in common. Each throwing event involves Preliminary Movements, an Approach, a Delivery Position, the Delivery of the implement and a Finish.

Preliminary movements of the throws include assuming the grip, assuming the starting position or stance, and any rhythmic or setup movements, such as winds.

The **approach** refers to the locomotive movements that bring the athlete into position to deliver the implement. These movements include the glide in the shot put, the turns in the shot put, hammer and discus, and the run and crossovers in the javelin. The purpose of the approach is to develop momentum and velocity in the thrower/implement system.

The **delivery position** refers to the position attained at the end of the approach, from which the implement is thrown. In most cases this is a position of double support, but in the javelin, the delivery begins in single support and finishes in double support.

The **delivery** consists of the throwing movement as performed from the delivery position.

The **finish** consists of the movements that occur after the implement's release. The finish consists of the follow-through and the reverse.

Other important aspects to understand when discussing the throwing events are the strike, the follow through and the reverse. The strike consists of the upper body activity during delivery, particularly movements of the throwing arm(s). The follow-through consists of movements of the upper body, particularly the throwing arm(s), after the implement's release. While no additional force can be applied to the implement after release, the follow-through is important because its presence insures the absence of premature deceleration prior to release. The reverse consists of the readjustment of the stance that occurs immediately after release. The purpose of the reverse is to redirect unchecked momentum and prevent fouling.

MECHANICAL FACTORS AFFECTING THROW PERFORMANCE.

Five factors dictate the performance on any given throw, and all technical teaching is geared toward affecting these parameters.

• **The Implement's Velocity at Release.** The greater the velocity the implement displays at release, the longer the flight time and consequently the farther it will travel.

• **The Implement's Angle of Release.** For each throwing event, there is an optimal angle of release that optimizes the flight path of the implement. This ideal angle of release is fairly consistent but may show slight variances based on environmental and anthropometric factors.

• **The Implement's Height at Release.** Within the parameters of good technique, the higher the point of release of the implement, the better the performance. The height of release is primarily determined by anthropometric factors.

• **Aerodynamic Factors.** The flight characteristics of an implement may be greatly altered by the shape of the implement, the spin or rotations of the implement, and the airflow around the implement caused by the implement's spin and travel. We classify these factors and their effects on performance as aerodynamics. The discus and javelin are aerodynamic implements. It is crucial for the thrower to ensure optimal angle of attack of the implement at release. An implement that displays proper attitude and pitch will achieve minimal drag and exhibit proper lift.

• **Spin and Oscillation.** The spin of the javelin and discus provide stability to the implement during flight. Oscillations or vibrations compromise implement aerodynamics, and reduce performance.

• **Wind Direction.** Wind direction can significantly aid or hinder discus and javelin performance. A head wind that assists a discus or a men's javelin, can prove detrimental to the women's javelin due to the unique characteristics of these implements.

• **Release Position with Respect to the Point of Measurement.** Release position with respect to the point of measurement varies with each throwing event. It is not uncommon for a glide shot putter to project the throwing arm into the sector upon delivery, so that release of the implement actually occurs at a point that is beyond the point of measurement. Hammer and discus throwers release the implement from a position within the ring, at a point close to the point of measurement. Javelin throwers deliver well behind the point of measurement, allowing room for the follow through.

COMMONALITIES OF THE APPROACH

Each throwing event includes some type of approach. The approach can take different forms (a glide in the shot put, rotations in the discus, hammer, or shot put, or a run-up in the javelin). In each case, the approach serves three purposes.

The approach provides the thrower and the implement with momentum and velocity, increasing the opportunity for good performances. The approach should place the thrower in the correct physical location from which to execute the delivery of the implement, so that proper technique can be used and distance pre-

IMAGE OF SPORT PHOTO

served. The approach should place the body in the correct physical positions and motor environment to execute the mechanics of the delivery correctly.

The approach should consist of a gradual, smooth acceleration. It is a common error for a thrower to accelerate too quickly in the approach, only to decelerate later. Demanding patience and cuing slow to fast rhythm is common coaching practice. Throwers should demonstrate proper posture in order to achieve the proper body positions for the delivery. The positions and alignment of the head, torso, and pelvis determine the quality of posture and should be constantly addressed.

DELIVERY BIOMECHANICS AND POSTURAL INTEGRITY

The core of the body must be adequately stabilized to provide a solid base from which to apply force. This permits the body to apply force from a stable position, and withstand the impact associated with landing in the delivery position.

The core of the body must be aligned correctly in order to position the limbs for efficient operation. We are most concerned with the alignment of the head with respect to the spine, and the alignment of the pelvis with respect to the spine. A neutral alignment of the head insures muscle relaxation, stability and balance. The location of the head also dictates mechanical characteristics of the many third class levers operational in the throwing musculature, so poor head alignment disrupts strike mechanics. A neutral or slightly upwardly tilted pelvis enables relaxation and proper leg function when throwing. While certain movements in the throws may require the pelvis to be slightly downwardly rotated, this rotation should not be excessive or permanent. Also, a downwardly rotated pelvis cannot turn, and the body normally substitutes shifting strategies, disrupting technique.

This stabilized and aligned postural unit (head, spine, pelvis) must move in some predictable fashion. Erratic movements or radical changes in the path of movement of the body or implement make force application difficult.

ACCELERATING THE IMPLEMENT

According to the impulse equation, the longer we apply force to the implement, the greater the momentum changes in the implement will be. One strategy that throwers use to lengthen the amount of time they apply force to the implement is to lengthen the path the implement travels during the delivery. This is done in two ways:

- **Weight Transfer.** During the delivery, bodyweight is transferred from the back foot to the front foot, to effectively increase the path of the implement.
- **Closed Throwing Positions.** The delivery in throwing events begins with the body turned away from the direction of the throw. This enables the body to rotate through a greater angle as the implement is delivered, increasing the length of the path of the implement in a rotational sense. This alignment of the body, directed away from the throwing direction, is called a closed body position. Closed positions are used in all throwing events, but the nature of the implement may limit how closed the initial delivery position may be.

The acceleration of the implement must be consistent and positive. It is common error for athletes to accelerate the implement too quickly initially, only to decelerate it later. This concept of consistent, progressive acceleration pertains to the approach and delivery phases.

Many throwing events show implements that travel angular paths during the approach. In these cases, maximizing the curvilinear velocity of the implement is the primary concern. Maximizing curvilinear velocity requires positioning the implement as far as possible from the axis of rotation. Thus, in the discus and hammer, the greater the distance the implement is from athlete's axis of rotation, the greater implement velocity achieved.

Typically during the approach, throwers use extended body positions to establish high angular momentum values. This enables the thrower at delivery to reduce the body's effective radius and exhibit high angular velocities.

BLOCKING

As the body arrives in the delivery position, the front leg should be in position to stop most of the horizontal movement of the body to set up transfer of momentum to the implement. This stopping of horizontal movement is called blocking. While deceleration is important, it should not be complete and abrupt, but characterized by some amortization.

As the upper body turns and approaches the direction of the throw, the non-throwing arm should be pulled in toward the torso, decelerating the non-throwing side. This effectively moves the upper body's axis of rotation to the non-throwing side, accelerating the throwing side through an angular hinged moment. This block must be performed and completed before the shoulders reach a position where they are facing the direction of the throw. This permits this acceleration to occur in a useful direction. This block should decelerate rotational movement, but linear movement should continue.

The turning of the hips during the delivery should be stopped when the hips axis reaches a point perpendicular to the throwing direction. This blocking transfers energy to the upper body and establishes a stable platform from which the strike may be executed.

IMAGE OF SPORT PHOTO

SUMMATIONS OF FORCE

Upper body activity in delivery and the strike should result from a summation of forces. The large muscle groups of the body's core initiate the movement. Joints subsequently contribute to force generation and application, progressing from the body's core outward. While each throw has a unique ideal firing order, proximal to distal firing must be preserved. This proximal to distal firing relationship is also observed in the rotational aspects of delivery, as the body's core turns first, while the upper body temporarily remains passive.

During delivery, the body must turn smoothly in the direction of the throw. However, the upper and lower bodies do not turn from the same positions at the same time. In the delivery position, the shoulders are rotated farther from the direction of the throw than the hips. This relationship of the hips and shoulders is called separation, referring to the separation of their respective axes. Separation is present as the delivery position is achieved in all throws, but the specific positions of then hip axis, shoulder axis, and degrees of separation vary.

In efficient throwing, during delivery, unique patterns of extension exist between the upper and lower bodies. The hip joint should extend in concert with the hip, the knee with the shoulder, the ankle with the wrist, etc. This has great implications for the rotation necessary in good throwing, since excessive and/or premature extension in the upper body will disrupt rotation and promote extension in the lower body, and vice versa.

ELASTIC ENERGY GENERATION

The sweep of the non-throwing arm, coupled with the block, serves to set up an elastic situation in the chest musculature that helps accelerate the implement.

There is a slight amount of flexion in the legs that occurs in response to the impact associated with landing in the delivery position. This will set up an elastic situation as the legs extend, applying vertical force to the implement.

The delivery phase of the throw should be initiated with a turning of the lower body, while the upper body remains passive. This creates a twisting of the core of the body called *torque*. This torque creates the potential for elastic energy generation as untwisting occurs, and serves as the mechanism by which rotational energy from the lower body is transferred to the upper body.

In the throws, when we examine the path of the body's center of mass through the approach and delivery phases, we see vertical rises and falls. These provide opportunities for elastic loading via joint flexion and extension and potential energy development. An oscillating system is created requiring less energy input for high performance.

When we examine the path of the implement through the approach and delivery phases, we also see vertical rises and falls. Again, these provide opportuni-

IMAGE OF SPORT PHOTO

ties for elastic loading and potential energy development. These oscillations may also be found in other planes as well.

LOWER BODY MECHANICS IN THE DELIVERY

Generally, in throwing, a heel-ball alignment of the feet should be used in the delivery position. This means that the heel of the rear foot and the ball of the front foot should lie on a line corresponding to the direction of the throw. This alignment best permits blocking and turning as described below.

During the delivery of most throwing activities, as the front foot grounds, the front foot should be aligned at approximately 40 degrees to the direction of the throw, so that the left toe points to the right for a right handed thrower. Because of the anatomical structure of the hip, this foot alignment permits the hips to stop turning when facing the throwing direction. This sets up better blocking and deceleration of the rotating hip axis.

As delivery is initiated, the back foot should be directed approximately 90 degrees from the direction of the throw. This position varies slightly from event to event.

As the rear foot grounds, some amortization should take place and the leg should amortize to some degree. This produces a passive, yielding contact. This flexion should remain in the rear leg throughout most of the delivery. Overactiveness or pushing off of this foot triggers extension reflexes and prevents the hip axis from turning in delivery.

The feet should be spaced so that when weight is completely on the rear foot, the front leg is extended. This optimizes lengthening of the implement's path

During the delivery, bodyweight is transferred from the back foot to the front foot, to effectively lengthen the path of the implement. This weight transfer must be complete.

The lower body should show a somewhat closed position as the body arrives in the delivery position. During the delivery, the lower body, particularly the hip axis, should turn smoothly and progressively to a position facing the direction of the throw. Anatomical structure of the hip will decelerate and block the hip axis properly if the stance is correct. Rotation and extension are conflicting kinetic chain functions, so premature extension of the rear leg serves to disrupt rotation. The hip axis cannot be pushed forward, it must be turned.

Since weight is being transferred as this turning takes place, both legs must be involved. Early in the delivery phase, the rear leg is bearing most of the weight, and initiates the rotation. Later, the front leg is bearing most of the weight, and finishes the rotation.

The turning and weight transfer movements during delivery should occur simultaneously, and at similar rates. Transferring then turning, or vice versa, produces an inherently inefficient arrangement.

During delivery, extension of the legs produces a vertical force to the implement. Integration of vertical force generation from the legs and horizontal force application from the strike during delivery should be created in unison and with correct timing.

UPPER BODY MECHANICS IN THE DELIVERY

The **grip** is a critical part of the throw. The proper grip puts the wrist and hand in a position to contribute to force production. Because joints effectively communicate through networks of muscle and fascia, the positioning of the distal joint of a limb dictates much of the characteristics of the firing order of that limb. This means that the position of the hand and wrist dictate much of the firing characteristics of the entire throwing limb. Proper striking mechanics may be impossible to achieve if the grip is not correct.

During the delivery, the upper body should turn smoothly and progressively from its closed position to a position facing the direction of the throw. This turning is initiated in response to the torque generated in the body's core. For this reason, the upper body must remain passive as delivery begins.

In the delivery position, there are unique relationships between the position of certain body parts and the implement. As the delivery begins and turning takes place, these relationships should be preserved. It is a common error to initiate movement and turning in the upper body without moving the implement, destroying this positional relationship. It is also a common error to see the implement move without advancement or turning of the upper body, again destroying this relationship.

A sweeping movement of the non-throwing arm prior to the strike can serve as a momentum development tool to enhance the strike. For this to occur, the arm must be in a somewhat extended position so that a significant moment is created. Also, momentum created is unique to a plane, so the movement must occur in the same plane as the strike.

In single armed throwing events, as the upper body turns and approaches the direction of the throw, the non-throwing arm should be pulled in toward the torso, decelerating the rotation of the non-throwing side and producing an acceleration of the throwing side.

Upper body activity in delivery and the strike should exhibit an efficient summation of forces. Weight transfer and turning of the torso initiate the movement, followed by contributions of the shoulder, then the elbow, then the wrist, hand, etc. While each throw has a unique ideal firing order, proximal to distal firing must be preserved.

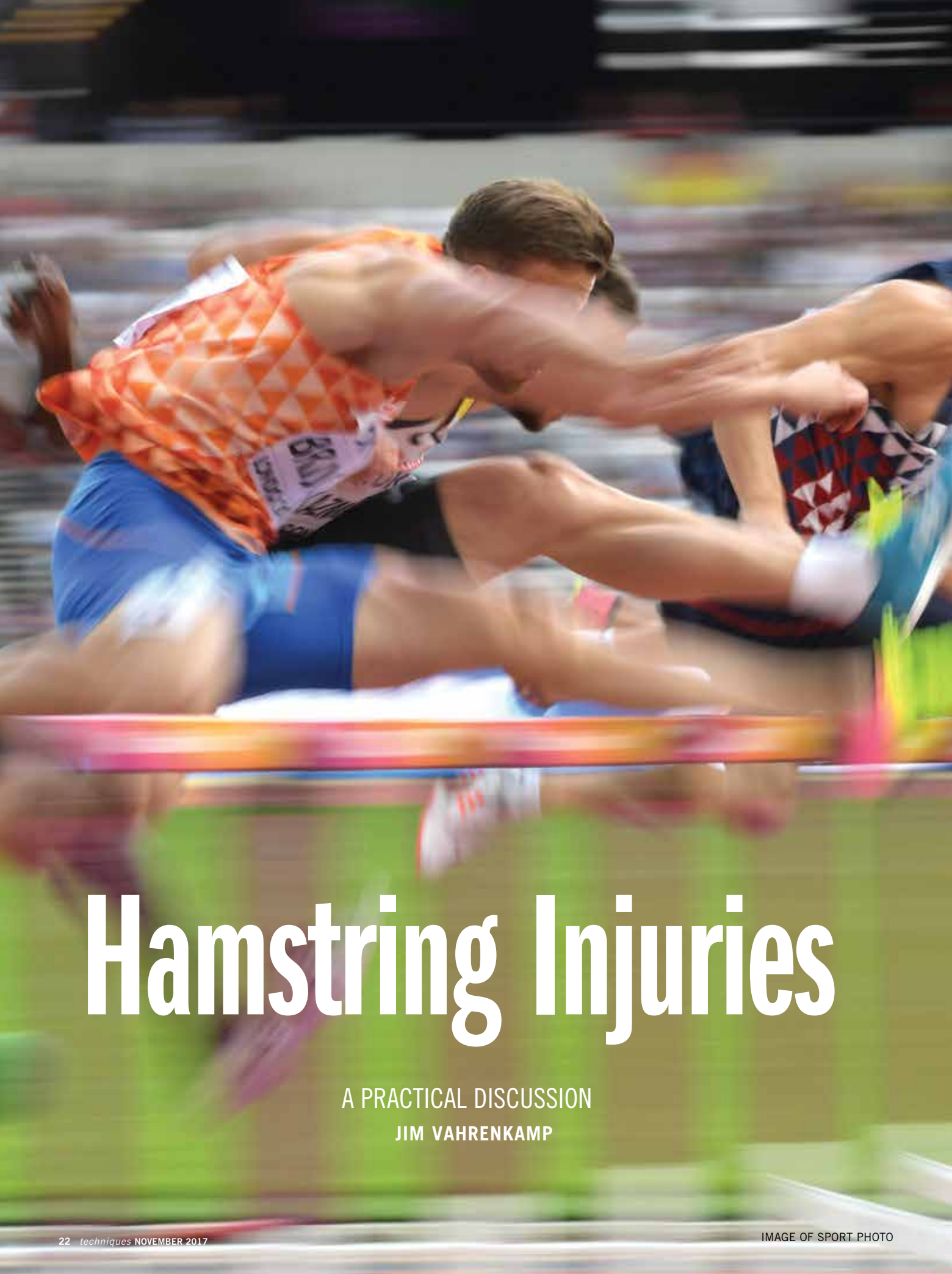
COMMONALITIES OF THE FINISH

The reverse is a maneuver that enables the thrower to follow through, and maintain or regain balance after the throw is completed to prevent fouling. While it varies from event to event, it typically involves adjusting the stance and torso.

Force application to the implement must be maximized, and to accomplish this, forces must be applied from a stable position. Reversing prematurely disrupts the latter stages of the strike and often results in the strike occurring from an airborne position. While some elite thrower do show flight in the final stages of delivery, in these cases this results from the application of huge forces in a correct summation, and is not at all the same as the premature reversal phenomenon. Having throwers do a significant amount of work with the feet fixed is common coaching practice.

The throw should not be considered complete when the implement leaves the hand. Each throw has a position of locus of the throwing arm when its follow through motion stops. The strike should be considered a movement through the release to the locus position. While mechanically force is no longer being applied to the implement once it leaves the hand, failure to reach this position is indicative of premature deceleration.

This article is taken from the USTFCCCA Track and Field Academy Throws Specialist Certification Course (SCC) text. Boo Schexnayder is primarily responsible for the content of the curriculum. Don Babbitt contributed to the material contained in this excerpt.



Hamstring Injuries

A PRACTICAL DISCUSSION

JIM VAHRENKAMP

IMAGE OF SPORT PHOTO

Motor patterns are important to what we do. Consider the following movements:

Body weight squat
Weighted squat
Front squat
Overhead squat
Hang clean
Power clean
Hang snatch
Power snatch
Over head backward
Between legs forward
Standing long jump
Hurdle hops
Block start

Each movement on this list builds both in intensity, range of movement or in complexity on the base motor pattern of the squat. Each skill requires increased demand or intensity of the movement. The by-product of this increase is often irritation of the soft tissue, ligament or tendon structures resulting in tendinopathies or syndromes which require cessation of activity to get symptoms to abate. As coaches and athletes, the abatement of symptoms does nothing to solve the root of the problem, and often we find ourselves again at square one, wondering when the symptoms of our dysfunction will present themselves again, inhibiting our potential and ultimately ending or hampering our season.

In sports, the muscle most often injured is the hamstring. As an athlete, I suffered injuries to my hamstrings repeatedly. Usually I was told it was a strength issue which made me resolve to develop enough strength where I would never injure my hamstring again. Even after improving my squat max significantly I still found myself a victim of another hamstring injury. Early in my career hamstring injuries plagued some of my athletes and yet not others. To me, it seemed there was no rhyme or reason to what I was observing. What was the problem? Was it weakness? A technical error? What was it?

The central tenant of the Central Governor Theory states that the brain serves as a primary entity that serves to protect us from ourselves. In distance races, it is the small voice in the back of our head encouraging us to save some for the finish. Timothy Noakes asserts that we are capable of much more than we can demonstrate because of the brains interest in self-preservation.

In sprinting the CGT is present in the length-tension relationship in the musculature of the posterior chain. Motor dysfunction in the psoas and glutes as a

result of persistent seated position cause negative compensation patterns where the hamstrings pick up the load that the glutes typically perform. At submaximal velocities these compensation patterns don't present an imminent threat, however as speeds approach maximal, the brain shortens the hamstring to protect the organism from itself and the potential damage present in the large amplitudes of movement and rates of movement. Stretching these tight muscles will do nothing to convince the brain that function has returned to the psoas and glutes. It will, however, deaden proprioceptors in the hamstring further compromising the integrity of the system as a whole

During my second year at Augustana University in South Dakota, I had a talented Norwegian athlete named Henrik Holmberg. After several hamstring injuries, he went to see an athletic trainer named Brad Pfeifle who prescribed several general strength exercises. The following year Henrik blew up. He improved in every event and went from being a kid that could score at the conference championship to a national qualifier in several events.

Something about that experience still did not answer all of my questions. Of the muscles in the lower leg, why was the hamstring the only one getting injured? Rarely did I see issues in the glute, the adductor, the soleus or the psoas. If each of these muscles is in use during full velocity movement, why then is the hamstring the only muscle becoming injured? I researched the mechanics of running by reading and speaking with experts like Ralph Mann, Loren Seagrave, and Boo Schexnayder. What began to present itself was a different paradigm from what I had previously coached from.

A product of these conversations was a move to look at movement patterns. Within these movement-based coaching paradigms, the most important elements are posture, mechanics, and function. Humans develop coordination through the combination of sub-maximal and maximal rehearsal of movement patterns. Babies are a prime example. We have each observed a child as they develop the coordination and mastery of the movement patterns required to move from stumbling to walking to running and jumping. Most of these children develop these motor patterns as they explore their world barefoot. Young children also have the ability to move through complete ranges of motion such as a full depth squat without difficulty. It is common sense to understand that these abilities are achieved before developing maximal strength levels. Children accomplish all of these functional abilities through general strength work.

So where does a virus in a movement pattern originate? As humans, we each solve movement problems differently. There are general principals to how we run and jump, however, the nuanced details of how we accelerate or amortize impact have unique differences specific to our development of our movement skills. For example, Stuart McMillen, sprint coach at Altis suggests that facially driven athletes organize their motor patterns in a way where they tend to pull down the track while other athletes that display a propensity for excellence in the squat tend to push themselves down the track. These differences are displayed in the location of their COM at touchdown and the errors in sprint pattern that arise. As athletes, we lean toward our strengths and away from our weaknesses

Another large part of the issue is injury history. Our primary engines of movement are the shoulders and the hips. The body seeks balance in the movement which means that the upper body mirrors the movement of the lower body and vice versa. That means that often injuries in the posterior chain of the upper body affect the movement patterns in the lower body as the body attempts to compensate for changes in ranges of motion resulting in an injury chain.

Three other pieces of our everyday life further complicate these issues. Our posture in day to day life involves a great deal of sitting which affects our posture in sport or activity. Because the body moves toward homeostasis, our movement patterns gravitate to a hunched compromised posture. Shoes also complicate things. While protection for the soles of our feet is a wonderful development, the way that our foot interacts with the ground has a lot to do with how we use or fire the muscles in our body in movement. Often when I have athletes that run heel-toe, merely removing shoes and having them run lightly on the track or grass reveals the proper motor pattern that was developed as a child. The shoe often reinforces a movement virus.

To identify movement issues in our athletes, we rely on movement screens. Often in the industry that means three or four tests that show us ranges of motions that the athlete is capable. In our program we rely on a warm-up that requires athletes to move in every plane of motion while challenging coordination. Additionally we look at posture in hurdle mobility to determine appropriate ranges of motion and proper movement coordination in the multiple joints associated with running. Lastly, we also look at the movement in the weight room. I am not interested in increasing horsepower blindly. Horsepower typically exacerbates problems rather than solving them.

Each of the following should be considered opportunities to screen athletes for the presence of compensation in normal movement patterns. Keep in mind that adjustments to any established motor patterns do not promise immediate improvements in performance. The organism is forced to reevaluate its solution to movement in an effort move in a pattern that minimizes injury risk.

Warm Up
Hurdle Mobility
FMS
Weight Lifting

Once we have identified a virus in a particular movement pattern, we use the following modalities to address the problem.

RE-EDUCATION OF MOVEMENT PATTERNS

Hurdle Mobility: Used to identify and coach correct firing patterns, ranges of motion in joints while maintaining posture. The dynamic nature of this activity challenges the athlete to improve and develop functional movement patterns that stave off injury.

General Strength: These movements are performed in static positions where athletes can be coached to fire the correct musculature associated with correct movement patterns. More often than not our general strength sessions will have a glute dominant theme to a session where athletes seek to ensure that the glutes are the primary driver in each of the movement required.

Multi Throws: Multi throws are a more dynamic opportunity where correct coordination can be developed prior to moving into the weight room to introduce

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greater loads to the system. They also allow the coach to continue the teaching process in a more dynamic situation where the athlete is able to make connections to other more dynamic activities.

Multi Jumps: The dynamic nature of this activity is more complex than multi throws because of the elastic nature of the movement. Correct posture can be emphasized while proper amortization of impact forces can be coached.

Sprint Drills: Sprint drills have very little transfer to the maximum velocity demands of coordination of sprinting. They do offer, however, an excellent opportunity to develop specific strength while developing coordination and maintaining posture during a complex and dynamic movement that does transfer to sprinting. Again proper movement patterns can be cued here and the actual drill can be used as a movement screen to detect and injury or compensation pattern before it threatens the organism further.

Tissue Mobilization: Foam rolling, Active Release Therapy, Rolling Sticks, Fascial Stretching, Deep Tissue Massage all have a role in ensuring that the muscle tissue is supple and ready for the dynamic demands of sport. A good coach will be familiar with what healthy supple muscle tissue feels like. This knowledge can be developed through conversations with massage therapists and other professionals. Kelly Staret has done an excellent job providing solutions to these issues in his book, *The Supple Leopard*.

Muscular Activation: Through the palpation of certain trigger points dysfunctional muscles can be activated for a period of time, however in my experience teaching the body to properly recruit the correct tissue for movement is the only solution with lasting effects.

In conclusion, there are many factors present which require a multifaceted approach to maintaining healthy movement patterns. The hamstring is an alarm bell for dysfunction in the posterior chain, indicating issues including but not limited to a hampered range of motion in the ankle, glute dysfunction, mechanical issues, etc. Boo Schexnayder suggest in a short paper on dealing with hamstring issues that the level of use of the hamstring eliminates the consideration of weakness in the muscle. This article should not be considered a definitive work on the matter but rather a starting point for further research. Additionally, there is no replacement for practice and experimentation. The suggestions here should be considered a loose guideline for the development of your own expertise.

SUGGESTED READING

Movement - Gray
Supple Leopard - Kelly Starret
Long Anatomy Trains

Jim Vahrenkamp is the Director of Cross Country and Track and Field at Queens University in Charlotte, North Carolina.

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SIMPLIFYING THE POLE VAULT

A NON-VAULTER'S APPROACH TO SUCCESS

ELI SUNQUIST

The purpose of this article is to share a different approach to the teaching and coaching of the pole vault, so that vaulters (and their coaches) will be able to learn the event quicker and more effectively. I was not a pole vaulter myself and I have been coaching the event for less than five years. However, I do believe that I have a unique outlook into the event, as my first group of vaulters were decathletes. I had to teach them how to vault in a limited capacity, as they had nine other events to train for. So I looked at what was necessary for safety and success, and focused only on those things. This approach to training worked quite well, and I have stuck with it in the coaching of pole vaulters of all levels.

To the outside observer, new coach, and nervous parent, the pole vault looks like a very complicated and dangerous event. People are running really fast, jumping high into the air, and using a pole (that might or might not break) to fling themselves up into the air. However, I believe that the "complexity" of the pole vault has become one of a self-fulfilling prophesy. In reality, the event is no more difficult to learn than learning how to throw the discus, run the hurdles, or even make an omelet. It is all about how we TEACH the event that makes the difference. The purpose of this article is to simply the vault for the athlete, the coach, the nervous parent and the track and field community in general.

Richard Lavoie, world-renowned educator of children with special needs, once said that the key to learning and reinforcing a new skill was that the individual "needed opportunities to practice skills in authentic situations". Is what we are doing, the drills we are practicing having the sort of carry over to the whole skill as we would like? Or are they just cool, fun, or complicated looking drills that really do nothing to progress of the event? A lot of debate has gone on about whole or part learning. Since the pole vault, much like the triple jump, is very much a serial event it has to be practiced as a whole. Sure, there are times for drills, but the drills need to have a direct influence on what you are trying to accomplish and if they don't then you are wasting your time.

When I start with a vaulter for the first time, whether they have been vaulting for five years or five minutes, I go over the goals of the vault with them. I make it very clear that the purpose of the event is to jump as high as possible, in a safe manner. That is it. The goal of the event is not to "get upside-down" or get on the biggest pole possible, to bend the pole, or even "get vertical". These are all great things to aspire to but do not make up the purpose of the event. The goal of the hurdles is to run as fast as possible, the goal of the javelin is to throw it as far as possible, and the goal of the pole vault is the exact same goal of the high jump. To jump as high as possible, in a safe manner. If you always keep this in mind your list of drills will shrink and your ability to keep working on the event as a whole will help you achieve the goals of the vault much sooner.

JACKSONVILLE ATHLETIC CLUB (JAC) TECHNICAL MODEL / VOCABULARY:

The semantics of different aspects of the vault are extremely important when coaching the pole vault. For instance, if you tell a vaulter to "get upside-down" then they might try to turn upside down as soon as they can (i.e. right off the ground) thus killing pole speed, making it very difficult to vault high and safely.

The following are my thoughts on a sound technical model, as well as the vocabulary that I use when teaching and coaching the vault. (For the purpose of this article I will assume the vaulter is right handed, jumping off of their left foot.)

Approach Run: The purpose of the approach run is simply to produce as much speed as possible, under control, so that at takeoff the vaulter will be able to put as much energy from the run into the pole as possible. The length of the approach run is very individualistic and the coach needs to spend a lot of time working with their individual athletes to determine the right length. Speed at takeoff is vital so the coach needs to make sure that the athlete has a distance that fits their needs and ability levels. Having high school girls run from nine lefts, when their 100m PR is over 14 seconds really isn't the best idea. Most high school vaulters should start with a 12 step approach (six lefts) and then move back if they are able to handle that approach. The cue I use is "speed at takeoff" so that they think about speeding up into their last few steps and takeoff.

Pole Drop: I will talk about running with the pole in a later section, but make sure that at the start of the run the pole carry is relative to the length of the run. Yes, Bubka had his pole almost perpendicular to the ground at the start of the run but he also had a run of right at 40m and a very heavy pole. Make sure you keep in mind the length and speed of approach first when determining the start position of the pole as well as how to gradually lower the pole as you are approaching the takeoff.

Transition from run to takeoff: As the vaulter is approaching the box, the feet should be speeding up and the arms should be lowering the pole in a sequential way. This means that there will be a natural lowering process using the left hand as a fulcrum to steady the pole which allows the right hand to move up the body and forward. Do not complicate this anymore than it needs to be. Simply put, as the vaulter gets closer to the box, lower the pole. Hands moving up and forward at takeoff is what needs to be practiced.

Takeoff: As the pole vault is a jumping event, much time needs to be spent on learning and teaching that the takeoff is an aggressive jump off the ground. The harder you jump off the ground, the easier it will be to move the pole to vertical and put energy into the pole. For the right handed vaulter they will push forward and up off the ground with their left foot while both arms also also push up on the pole up and forward in an attempt to get the whole unit (vaulter and pole) moving both up and forward. The cue that I use here is "Get the top of the pole to vertical / out in front of you as fast as possible." The main goal of the takeoff is to move the pole forward, and drive the body forward. This is why talking about getting upside at takeoff can be dangerous as it instills in the vaulter's mind getting the shoulders back at takeoff, which is the opposite of trying to move everything forward at takeoff. Any talk of arms moving back at takeoff, or shoulders / head moving back at takeoff should be eliminated. Takeoff up and forward

and your arms, shoulders, and body need to be doing the same.

Swing: After takeoff, which should be an aggressive jumping and pushing motion, the fast, aggressive swing comes next. The swing is a simple movement, and can be performed by the youngest and most novice vaulters. The left leg, which is now left behind the vaulter after an aggressive, forward jump at takeoff, simply swings to the top of the pole as fast as possible. Let me emphasize using simple cues when coaching the vault. After the takeoff comes the swing. There is no cuing of shoulders getting back, getting upside-down, or getting into a rock back position. All of these cues are what coaches see as a result of a good swing. If you swing aggressively to the top of the pole, your shoulders will automatically move back as your legs and hips move up. Most of the time spent in coaching this phase should focus in on the left leg, not the head or shoulders.

As the vaulter's leg is swinging up to the top of the pole, the arms should still be trying to put pressure against the pole. Pulling should only occur once the athlete gets to the top of the pole (i.e once the swing is completed). Keep reminding the vaulter that the vault is a "pushing" activity from takeoff until they get to the top of the pole, then immediately switches to a "pulling activity" only AFTER they get to the top of the pole. Pulling in early will reduce pole speed which is detrimental to jumping high. Swing to the top of the pole FAST, then pull up the pole FAST.

Pull / Turn: This aspect of the vault is also quite simple, but is directly correlated to the run, takeoff, and swing. Once the vaulter swings up to the top of the pole, they pull (this should be the first time they are pulling at all) their body straight up the pole. Feet and legs go up while the head and shoulders go back. Alan Launder simply says "The legs go up, and the shoulders go down". Much like a long jump landing or the arch over a high jump bar, most of the time in training should be working on the aspects BEFORE this happens. A good landing or arch or pull up the pole are a direct result of what happens before that.

JAC TEACHING PROGRESSION / DRILLS WE USE:

Pole carry- We always start with a small pole to work on the fundamentals. Once the vaulter is proficient in a correct pole carry, we then add in walking drills, followed by jogging drills, then sprint drills with a pole. We also do a series of pole carry drills as part of our cool down on certain days to help force proper

mechanics when the athlete is tired. This is a great way to kill two birds with one stone. The main goal is to get the athlete not just comfortable carrying the pole, but also improve their coordination.

Running with the pole: Running with the pole is a learned skill, so it must be rehearsed regularly, both on and off the runway. One day a week we do acceleration development work with a pole. This is separate than pole runs (which mimic the approach) as the goal of the acceleration development work is to increase power output and work on the first one third of the approach. We cue the athlete to push as hard as they can down the track without worrying about the full approach run rhythm. The vaulters usually use a pole or two bigger than their big pole. This allows a small bit of resistance that will help build confidence later when it does come time to get on a bigger pole. We follow the principles of speed development throughout the training week, doing one-third of the work with a pole, and two-thirds of the work without a pole.

Plant and takeoff: The most important parts of the plant and the takeoff are jumping up and forward at takeoff as well as having the hands high to push the pole forward and up and takeoff. The movements need to happen in a uniform manner and we do most of our takeoff work on a stiff pole. This ensures the athlete focuses on moving the pole to vertical and being aggressive on the jump off the ground. We start holding about halfway up the pole (a big pole) from four total steps (two lefts) and gradually work our way up the pole. The challenge is to see how high they can hold on a

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very stiff pole from an approach of four to five lefts while still making it in the pit safely. The athlete will run faster, jump harder off the ground and use their hands very effectively in order to do this. The adjustments that we use if they are making it into the pit easily are to go up a handgrip, and then by going back six-inches on their run. We use a big pole for this, as it helps the athlete be aggressive and get them used to running and jumping with a big pole.

Swing: To work on the swing, we stay with the straight pole drills. We see how high the athlete can hold but still making it into the pit safely. The jump off the ground needs to be very forceful (up and forward) and as soon as the takeoff leg leaves the ground the athlete is cued to swing their leg up to the top of the pole as fast as possible. Simple movement, simple cue. The faster they swing the more energy it adds to the pole / vaulter system which will then help to increase pole speed. We start with two lefts and go back to four lefts on this drill. Same adjustments are made in terms of grip and run on the drill described above.

Getting feet up over the top of the pole: To work on the athlete getting their feet up the pole after the swing we vault from three-five lefts on a pole that is comfortable for the athlete and they try to get their feet to touch a bungee that is up at a challenging height for the athlete. Usually this is one to two inches higher than the athlete's current PR.

PROBLEM SOLVING:

What to do if your athlete can't takeoff?: One common error in pole vaulting practice is to allow athletes to run through and not takeoff. If the athlete is not taking off there is a reason for it. It is not because they aren't "tough enough" or "weak" but rather it is because something is off. Do they feel too far away? Do they feel that the pole is too stiff? Are they thinking too much? We have a strict three strike policy at our practices. If an athlete runs through three times in a row we do what we call a "re- boot". The athlete gets on a bigger pole and does straight pole takeoffs from six steps (three lefts). The athlete is encouraged to run very fast, jump very aggressively off the ground and then swing very fast up to the top of the pole. This reinforces jumping off the ground, being aggressive (bigger pole) and swinging fast. The athlete is then moved up a handgrip each time and the run is moved back six inches at a time until the athlete feels confident enough to jump again from a short run. We have had a lot of success in terms of fixing athletes who couldn't takeoff. Once they get their confidence back up with the straight pole they are able to jump again in practice. You should never have your athletes run through more than three times in a row in a practice session. Fix it and then get back to jumping.

A few years ago I had a high school jumper who had a hard time taking off from any run longer than four lefts in practice. I started working with him in February and he had been stuck at his current PR for over a year. There was a stretch of six weeks where all we did in practice was pole runs, straight pole takeoffs, and straight pole jumping from a short run. In April he PR'ed by two feet. The work we did in practice was very mundane, very boring, yet very beneficial. He trusted the system, put in the work, and saw the improvements. Make sure you are always doing something in practice to help your vaulter improve.

Have a sense of urgency about getting better. No one gets better when they spend a whole practice running through.

Pole Selection: A big topic in the vault community is pole selection.

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What size pole should my vaulter get on? Shouldn't they jump on the biggest pole they can get on so that they can vault higher? Can they vault on poles rated less than their body weight? The answers to all pole selection questions are beyond the scope of this article but one thing that must be mentioned is that of getting on a bigger pole. All things the same (speed, technique, strength) the athlete who can get on the bigger pole will jump the highest. However, this is only after a certain level of technique and experience has been achieved. Always work on full vaults on a pole that the athlete can comfortably jump on.

Pole selection for any day, whether it is a small meet, practice, or big competition, is very dependent on numerous factors. Weather, adrenaline, injuries, length of run, all are factors that must be in play when determining what pole to use. Don't get caught up in the numbers. If the athlete trusts you as a coach, you should be able to put them on the right pole for the situation and they will be able to jump just fine on them.

In practice, we jump from two, three, four,or five lefts. Very rarely will we jump from an approach farther back than five lefts in practice. The main reason is that this allows the athlete to take more jumps in a session. I never try to get vaulters on challenging poles in practice from a longer run. All we work on is good technique from a short run and then over time this will allow them to get on bigger poles in practice from the same run. Our kids leave their competition poles in the shed during practice. The whole goal of practice is to improve technique, speed, and strength. Trying to get on a big pole in practice is a recipe for frustration and injury.

FINAL THOUGHTS:

If you are a youth or high school coach, please spend a lot of time on teaching the fundamentals of the vault to your athletes. The ultimate goal for your vaulter is to learn great fundamental technique so that they will be able to continue to improve in college and beyond. The pole vault takes years to master so there should be no reason that your vaulter should not have a very enjoyable and successful career, IF you teach them how to vault safely and correctly. This does mean spending time on smaller poles so the athlete can learn the technical model. Over time, as they get faster, stronger, and more confident, they will be able to progress on bigger poles. Moving to a bigger pole should not be a frightening thing for a vaulter rather it should be the next logical move (i.e. they are doing everything correctly and moving into the pit easily) and one that is understood as such by the vaulter. The pole that they should be vaulting on should be directly related to their approach run, how they are feeling that day, etc. Vault them on the poles that they can comfortably vault on and then make adjustments accordingly.

I have seen too many high school vaulters coached to instant gratification only to have very poor and dangerous technique. They can only jump as high as they are holding, which means that there will be a point of diminishing returns. What is worse is that they go to college and never improve. A vaulter should continue to improve every year IF they have a technical model that is sound.

If you simplify the vault in your teaching and drill selection, you will allow your vaulter to learn quicker, safer allowing your vaulter to have a more successful long term career. A state championship is a great accomplishment, but that should not be the ultimate goal for you or your vaulter. The ultimate goal should be for your athlete to have a technical model that will allow them to continue to improve year in and year out, and do so in a safe manner.

ACKNOWLEDGEMENTS

I can't express enough how grateful I am to have learned from some of the best coaches in the world. To all of you, thank you for sharing your knowledge with me. A special thanks to Bryan Delsite, Noel Ruebel and Robert Olesen, who pushed me into learning the vault, Glenn McAtee and Todd Lane (two great vault coaches who never vaulted) for shedding light into the simplicity of the vault, Daniel Isaacs, Macey Ruebel, and Alan Launder for teaching me about the vault the Australian way, Viktor Chistiakov for teaching me about the Russian pole vault system, Clark Humphries, Adam Steinwachs and Drew Hardyk for patiently answering all of my questions, as well as all of the vaulters who vaulted for me.

Your improvements were an inspiration to me, and it was a pleasure to watch every single one of you get better.

Coach Eli Sunquist founded the Jacksonville Athletic Club in 2013 where he works extensively with athletes in the pole vault, javelin, combined events and jumps among other disciplines.

BOB MULLEN PHOTO

Cross Country

THE BASICS OF VISUALIZATION

KEVIN O'GRATTAN

As coaches, we are always looking to help our athletes squeeze every drop of performance from themselves. When turning to the psychological toolbox, one of the tools commonly used is that of visualization. Visualizations can be used in a variety of formats to assist athletes in everything, from dealing with stressors associated with competition to remaining relaxed during their kick late in a race. While most coaches recognize visualizations can be helpful with athlete performance, many coaches do not take time to practice visualizations as a skill with the intent of improving athletes' ability to visualize. In practice, many coaches just expect their athletes to be able to effectively use visualizations as a tool. It has been noted that athletes competing at the highest levels internationally are reported to frequently use visualization techniques (Clarey, 2014). In many sports, such as golf, increased performance has been associated with increased use of imagery by athletes (Gregg and Hall, 2006). Studies have shown visualizations can increase self-confidence, athlete motivation, and decrease performance anxiety (Vealey, 2005). In addition, softball players using an imagery program were shown to experience increases in selective attention (Calmels and Berthoumieux, 2004). By working on

this skill with our athletes, we can put them in a position to be more successful more consistently.

It is important for coaches to realize that visualizing is a skill, and like all skills, our athletes will come to us with varying abilities along the spectrum of mastery. All of our athletes can move further along that spectrum, and one key to improvement may be refining the basics or prerequisites for high level visualizations. Whether we are looking to have our athletes use visualizations for mental practice or use visualizations to dial in their excitation level prior to competition, each of these methods can be enhanced by increasing skills associated with producing visualizations. One of the first competencies required for visualization is the ability to produce vivid images. "Vividness refers to how clearly athletes can see an image and how detailed the image appears to them" (Williams, & Krane 2015, p.242). Vividness also describes how many senses are used in the imagery. Sometimes we think of visualization as mental pictures, but athletes will be better served if their other senses are also involved in their mental training preparations. As American Olympic skiing aerialist Emily Cook says, "You have to smell it. You have to hear it. You have to feel it, everything" (Clarey 2014, p.6). Introducing training events to help athletes begin including additional sensory involvement during visualizing can be one of the first activities when seeking to create better visualizations.

The basics are best introduced during the cross country off season. The summer provides an easy time to help my cross country athletes learn in a non-stressful environment. Early in the training season, I will start by handing out oranges after the team has cooled down at the end of a practice. I find citrus works especially well for vividness training, as the aromatic component suits itself to inducing additional sensory recruitment during visualizations. I usually bring one orange for each member of the team, but you could certainly do this with a single orange. I pass them out and have the athletes gently take a fingernail and run it along

KEVIN OGRATTAN PHOTO

the orange breaking the skin, releasing the oil, but not through to the pith layer. Then, I have the athletes observe the orange, looking closely at its shape, the pores on its skin, and the fragrance the oil is emitting. After giving them a minute or two, I have the athletes set aside the orange or collect them back up. I ask them to close their eyes and imagine the orange. I reiterate those things I had pointed out for them to observe like the smell, its color, and its shape. I want them to create a very vivid reproduction of the orange they were holding in their mind and hope to activate more than just their visual representation. The goal is to have more senses involved in the visualization. The athletes usually do well with this activity, and as a bonus, I can pass back out the oranges at the end for them to eat. It is important for coaches to be mindful that when possible, making training enjoyable will help the athletes buy in. Since endurance training can be arduous, especially for newer athletes, this vividness training where they end with getting to eat the training tool can incorporate enjoyment in their training. This particular training activity could be included as early in the training cycle as wanted. There is no risk of starting visualizations training too early when developing foundational techniques.

The next step in the process for athletes is to work on controlling the images they create. Control in this context refers to the ability to manipulate the mental images and sensations they produce during visualization training. Here, I continue to build upon the techniques introduced with vividness as we progress towards ultimately using running examples. I will often continue to use citrus with my cross country athletes as the object so that they can continue to emphasize all of their senses. If I used oranges for the vividness activity, I may change it to grapefruit or a lemon so they experience a slightly different training stimuli. I also intentionally keep these activities relatively basic so athletes across the visualization ability spectrum can participate with success. For the control practice, I will have the athletes imagine the fruit is rolling down a ramp. If I suspect many of my athletes may have difficulty with this task, I will have a small wooden board on hand to give a visual demonstration for them to work from. Similar to the vividness training, I would ask them to close their eyes and visualize the fruit at the top of a ramp. I would remind them to take the object in with all their senses noting its size, shape, texture, and smell. Next, I would ask them to imagine having the fruit roll down the ramp. As this is something they had just seen, it should be fairly easy for them to replicate when visualizing. The next step is to ask them to practice this visualization forwards and backwards. Perhaps having them visualize the fruit at the bottom of the ramp and then rolling backwards up the ramp. This rewind practice technique puts the control of the visualization in the hands of the athletes. From this point, the coach can ask the athletes to control the fruit in visualizations that would not be possible in the real world. This can force the athlete to truly take control of the mental images produced. For example, the coach can instruct the athletes to have the fruit roll half way down the ramp and then have it stop before rising above the center of the ramp and remain in place floating stationary. Unlike the first control activity, this second control activity is not something you could physically demonstrate to your athletes and would push them to actually control the visualization they have created. This type of activity can progress to any number of mentally challenging scenarios that will test your athletes' ability to control the images they produce.

These control practice sessions can be a lot of fun for your athletes if the coach takes time to create interesting scenes for the athletes to imagine as they mentally manipulate the objects they imagine. Remember to keep it fun and be creative when thinking up what you will have the athletes control in their visions. Another option in creating control experiences would be to have the athletes suggest images, which can help them feel included in the process and have more team members commit to the practice. For example, athletes may suggest an outlandish scenario during visualization control practices, such as an elephant sliding down a playground slide. Although this scenario would have nothing to do with running, the practice can still have an impact on their ability to create visualizations and may even be a healthy diversion from training. Also, remember to generate prompts that will still include multisensory input such as smell or feel.

The next step in training the foundations of visualization is to move towards having athletes visualize running experiences. With the ultimate goal of having cross country athletes visualize racing scenarios, we want to move from improved vividness and image control towards more specific running visualizations. The idea is still to have athletes work from recent stimuli, just as they held and smelled the orange before trying to create the image in their mind. So, I like to pair initial running visualization trainings with absolute speed training for cross country athletes. However, this would work for any short distance high intensity workout that requires ample rest of several minutes between repetitions. I have found that unlike sprinters, distance athletes can sometimes have difficulty waiting thought the appropriate rest times for this type of workout. Therefore, I have them use this rest time, between runs, for visualizing. I will usually have my athletes split into two groups. While the first group runs, the second group can watch them and then close their eyes to visualize themselves completing the run event for a minute or two. The stimulus here

is again experienced just before the athlete is asked to visualize it so they have a very recent reference to work from. I believe this puts them in a good position to be successful in early running visualization training. The second group would then take the start line and do their run, while the first group is still in their recovery period. This would allow the first group to do the same visualization practice the second group had done during their run. As athletes continue this type of training over time, the repetitions of practicing visualizing would allow them to transition away from needing to see visual stimuli prior to being able to do a visualization. However, providing visual or auditory stimuli later in the season can still be a powerful tool in aiding athletes in creating more impactful visualizations.

As competition season begins, I love to have my athletes do visualizations while listening to a recording of our local starter giving final instructions through the sounding of the starter's pistol. It allows me to reinforce the importance of additional sensory input when creating images and helps my athletes create powerfully vivid visualizations. This recording is something you can have an assistant coach, volunteer, or athlete help obtain at a meet during your season. You may need to try this over a few meets to find the optimal positioning for making the recording. I find it helpful to hear the starter in addition to the background noise of athletes at the line leading up to the start. Once you have a good recording, the sounds of the bustling of athletes at the start line and the starting procedure will again help your athletes create a multisensory visualization in preparation for race day. I sequence all of these visualization training events to try and build upon one another with each progressing towards realistic and powerful images for my athletes. The ultimate goal is that athletes will be able to create vivid, and controllable visualizations of race based scenarios where they are engaging teammates and opponents for positive outcomes. At the end of the day, we want our athletes to picture themselves in races doing well or overcoming adversity.

One of the appealing characteristics of training vividness and control for visualizations is that it can be incorporated early in the training cycle. There are no prerequisites to this training and starting early will allow for better development. Our team is introduced this visualization training to athletes within the first or second week of summer conditioning with cross country athletes. During this time, the coach should elicit feedback from athletes to monitor progress and add additional complexity as task performance increases. The athlete feedback for early sessions should help coaches understand how well the athletes are visualizing and can illicit feedback for what types of practice events the athletes may want to work on. It is important to note that coaches should coordinate this training to their season plan so that athletes' will be prepared to practice multi-sensory complex race-based visualizations well ahead of critical championship post-season meets. All too often, coaches leave advanced visualization practice till the end of the season, and athletes are not afforded

PAIGE WINTERS PHOTO

the opportunity to develop the skill prior to its implementation. Furthermore, these skill building techniques are highly transferrable to all athletic endeavors. All track & field event groups can benefit from strengthening their visualization abilities through the aforementioned training techniques.

Strengthening the components of visualization through purposeful practice can enhance the effectiveness of athletes' psychological training. As cross country coaches, we recognize that mental training is just as important as physical training for athletes to compete at their potential. Distance running challenges our athletes both in competition and in practice by the very duration of exertion required. In developing any mental training program, it is important to be mindful that visualization is a skill, and like any skill, it can be improved by first focusing on executing foundational components at a high level.

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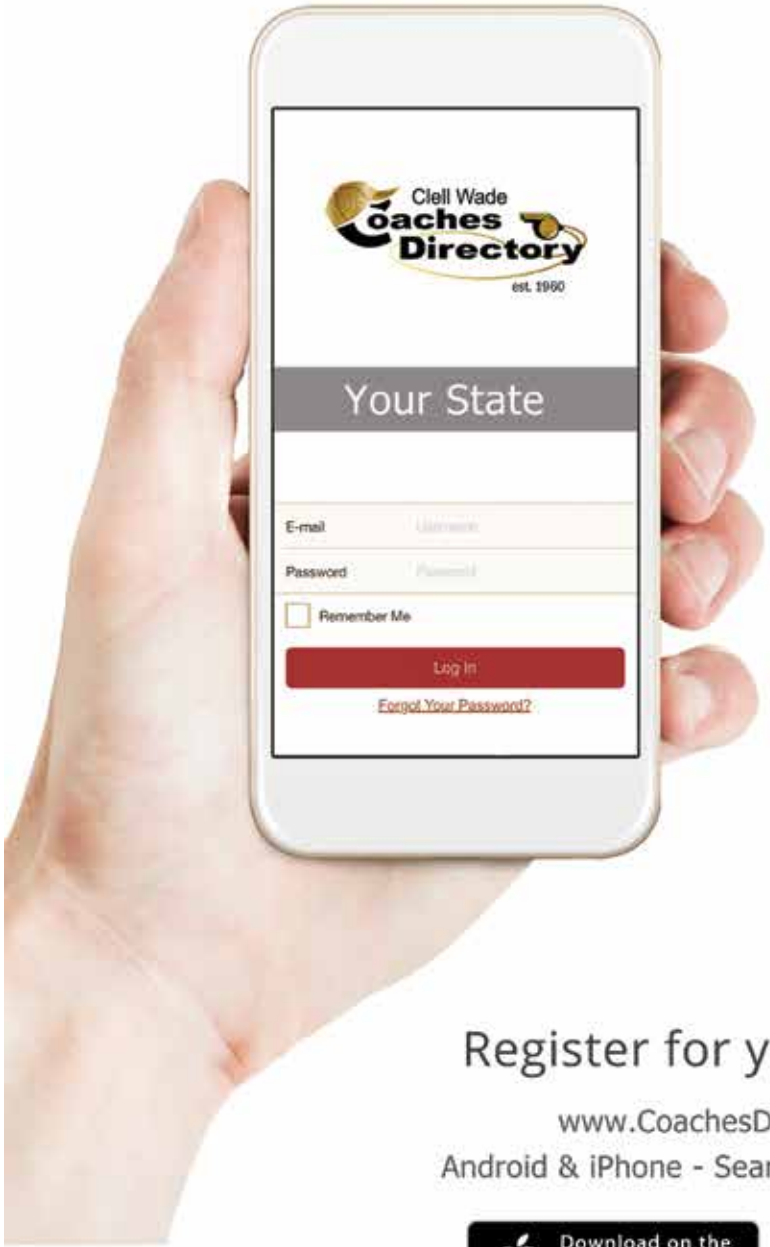

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AMY DEEM
UNIVERSITY OF MIAMI

Amy Deem has been a part of the Miami (Fla.) track & field program since 1990. By 2008, Deem was named the Director of Track & Field/ Cross Country, becoming just the sixth woman to oversee both the men's and women's track and cross country programs at a NCAA Division I institution.

Before her appointment as the head coach in 1990, no Hurricane had recorded a NCAA qualifying mark. Since then, however, her athletes have laid claim to 14 national championships and nearly 200 First Team All-America honors.

Under her guidance, the Hurricanes' hurdlers have dominated the national scene. Seven of those mentioned above 14 national championships have come in the hurdles, including an astounding five from Gillian Russell.

Deem saw her women dominate the Big East during the early portion of her career, capturing two indoor conference championships (2003 and 2004) while laying claim to six outdoor titles (1998-99, 2001-04). Since joining the ACC in 2004, Deem has won more ACC Women's Indoor Championships (four, including the 2017 title) than all but one coach in conference history.

Deem has also made her mark on the sport outside of her tenure as coach of the Hurricanes. She served as the President of the United States Track Coaches Association from 2003-05, in addition to serving as the head coach of the United States team at the 2007 World Championships and the 2001 USATF Junior National team that competed in England and Scotland. The pinnacle of her international experience came when she served as the Head Coach of the U.S. women's team at the 2012 Olympic Games.

PETE FARWELL
WILLIAMS COLLEGE

For nearly four decades, Pete Farwell has been synonymous with Williams College.

Farwell graduated from Williams College in 1973 and then returned to campus six years later as head coach of the men's cross country team. Over the next 37 years, Farwell developed the Ephs into a consistent winner on the NCAA Division III level. He took control of the women's cross country team in 2000 and handled several positions with the track & field team, including head coach (1988 to 2001, 2008 and 2013) and assistant coach (present).

While winning Little Three titles became the norm for Farwell and his programs (76 have been won under Farwell's watch), they didn't hit it big at NCAAs until 1994. That's when the Ephs handed Farwell his first NCAA team title, a feat they would repeat the following year.

Before Farwell took over the women's program in 2000, the highest the team finished at NCAAs was third in 1998. The Ephs finished runner-up in Farwell's first and second year, then won their first of three NCAA titles in 2002.

In 2015, the women posted the largest margin of victory in meet history (98 points), and the men claimed the runner-up spot by 9 points.

Farwell has seen 43 cross country runners earn 67 All-America honors and guided three of his runners to individual NCAA XC titles

As head coach of the track & field teams, Farwell won a total of 33 New England titles. On the national level, the men finished in the top-10 seven times.

Farwell's harriers have accumulated 152 All-America honors and 11 national championships on the track over the years.

JACK HAZEN
MALONE COLLEGE

Jack Hazen has been a fixture at Malone College since 1967, and success has been the name of the game from just about day one. Malone's men reached the NAIA Cross Country Championships in 1968. The Pioneers were a fixture at that meet for the next 43 years until their move to NCAA Division II in 2011, placing in the top ten 35 times.

Hazen guided Malone's men to its first NAIA team title in 1972 as it posted the largest margin of victory in the 17-year history of that meet until that point (77 points).

Under Hazen, the Pioneers would win four more NAIA XC crowns. Malone's women captured Hazen's second team title eight years into his reign (Hazen took over that program in 1991 and still leads it), and the men reeled off three in a row from 2007 to 2009.

Malone's men never lost a conference meet or district meet from 1968 until 2010, while the women earned their share of conference and district titles as well.

Under Hazen's guidance, the men's track & field team won 18 conference titles in a row from 1972 to 1989. District titles poured in, too, as the Pioneers won 19 including 16 straight between 1976 and 1991.

Hazen tutored a total of 325 All Americans if you combine honors earned in cross country and track & field, which account for more than 80 percent of the total number of All Americans in Malone athletics history.

Hazen's reach goes far beyond Canton, Ohio, where Malone University is located, as more than 100 of his former athletes are coaches themselves.

OF FAME CLASS OF 2017

BOB KERSEE
UCLA / CAL STATE NORTHRIDGE

Bob Kersee was a staple in collegiate track & field for more than 30 years. One of the premier sprints and hurdles coaches in the world, many collegiate athletes benefitted from the tutelage of Kersee and won NCAA, U.S., World and Olympic titles.

It didn't take long for Kersee to make his mark on the sport. His first coaching job was at Cal State Northridge where the Matadors experienced immediate success under his watch. His 1978 and 1979 squads won the AIAW Division I National Championships.

Kersee jumped to UCLA in 1980 and continued his success as an assistant coach for four seasons, helping the Bruins capture the women's 1982 and 1983 NCAA Division I outdoor titles. During that time, he mentored the likes of Florence Griffith, LaShon Nedd, Sherri Howard and Arlise Emerson – all of whom won NCAA championships.

In 1984, Kersee took the reins of the program, serving as its head coach for nine seasons.

The Bruins experienced unprecedented success at the conference level, winning five Pac-10 titles across his final seven years. At the national level, eight of his last nine teams recorded top-7 finishes, including a runner-up result in 1988, 1989 and 1990.

Outside of his work at UCLA, Kersee personally trained a "who's who" of sprinters and hurdlers who have competed at the highest level. He played an instrumental role in the success of Gail Devers, Greg Foster, Allyson Felix, Jeanette Bolden, Dawn Harper, Valerie Brisco-Hooks, Andre Phillips, Michelle Perry, Joanna Hayes, Kerron Clement, Shawn Crawford and Andrea Anderson, among others. Kersee also coached his wife, Jackie Joyner-Kersee, one of the most recognized names in the history of the sport.

FRED SAMARA
PRINCETON

Fred Samara is an Ivy League lifer. Six years after graduating from rival Penn and three years removed from competing at the 1976 Montreal Olympics in the decathlon, Samara was introduced as head coach of the Princeton men's track & field program in 1979 – a position he currently holds.

Since 1979, Samara's Tigers have won 41 Ivy League Heptagonal titles. Princeton has won 20 indoor crowns, 17 outdoor crowns and four in cross country.

The Tigers dominated the Ivy League from 1997 to 2000. During that span, Princeton earned back-to-back-to-back Triple Crowns, winning team titles in cross country, indoor track & field and outdoor track & field in the same academic year. The Tigers would later accomplish that same feat in 2010-11, 2011-12 and 2014-15.

The Tigers have won three individual NCAA titles under Samara's watch. Tora Harris swept the high jump crowns in 2002, Donn Cabral won the steeplechase in 2012 and the following year the team of Michael Williams, Austin Hollimon, Russell Dinkins and Peter Callahan brought the indoor distance medley relay title back to the Garden State.

Samara's athletes have pulled together for a total of 74 All-America honors in track & field and another three in cross country. Cabral was one of four Princeton athletes coached by Samara to compete in the Olympics. The others were Harris, Debbie Saint-Phard and Augie Wolf, who both starred in the shot put.

Outside of the collegiate level, Samara coached field events for the U.S. Track & Field Team at the 1987 IAAF World Championships in Rome and was an assistant coach for the Americans at the 1992 Barcelona Olympics.

PATRICK SHANE
BRIGHAM YOUNG UNIVERSITY

Patrick Shane returned to his alma mater as the first head coach of women's cross country after a standout career as a member of the BYU track & field team from 1966 to 1970, and a six-year stint as head cross country and track & field coach at Provo (Utah) High School from 1974 to 1980.

From Shane's first season in 1981 until his last in 2016, he guided the Cougars to 31 appearances at the NCAA Division I Cross Country Championships including 19 consecutive trips from 1989 to 2007. BYU also nabbed five successive bids from 1982 to 1986.

Under Shane's direction, the Cougars reached the pinnacle in the late 1990s to early 2000s when they won four national titles (1997, 1999, 2001, 2002) and finished runner-up an additional three times (1998, 2000, 2003).

There was not a more dominant team in the current era than BYU in 2001, a group that won the championship by 86 points, the largest margin of victory by a women's team in the 6K era.

Shane's Cougars also won 24 conference championships and 16 regional titles in his 36 years.

Shane also served as the distance and mid-distance coach with the women's track & field team at BYU and was the head coach of the program from 2011 to 2013. It was in 2011 when the Cougars swept the indoor and outdoor team titles in the Mountain West Conference.

During his tenure at BYU, Shane coached athletes earned 150 All America honor and nine individual NCAA titles.

Outside of the collegiate ranks, Shane served as head coach of three different national teams and mentored six athletes who would later compete in the Olympics.

THE BOWERMAN

CHRISTIAN COLEMAN
UNIVERSITY OF TENNESSEE

Christian Coleman became the first man to win the 60m & 200m titles indoors and the 100m & 200m titles outdoors in the same season since former Tennessee great Justin Gatlin did it in 2001.

Another 2017 goal of Coleman's was to break the 100m collegiate record of past Bowerman winner Ngoni Makusha of Florida State, a mission that he accomplished when he ran 9.82 at the NCAA Championship meet in Oregon.

Coleman won his first NCAA title with a scorching victory in the indoor 60 where he matched the collegiate record of 6.45 set by BYU's Leonard Myles-Mills in 1999 and won by .09, the largest margin of victory in meet history.

In the 200, Coleman broke the stagger by the 100-meter mark and clocked the second-fastest time in collegiate history (20.11). He won by 20 one-hundredths of a second, the largest spread between first and second place since 2007 (Walter Dix, 0.31).

He won his third and fourth NCAA titles of 2017 in Eugene, Oregon when he won the 100 and 200 at the Division I Outdoor Championships.

In 2017 alone, Coleman ran the 2nd fastest time in collegiate history over 200 meters indoors (20.11), and the 2nd fastest time in collegiate history over 200 meters outdoors (19.85). He became the 8th man in world history to go sub-10 in the 100 and sub-20 in the 200 in the same day, a feat he accomplished at the SEC Championship meet.

FRED KERLEY
TEXAS A&M

While Fred Kerley's 2017 collegiate track & field campaign was punctuated by his record-breaking dash at the NCAA West Preliminary Round in Austin, Texas, the former walk-on won four combined NCAA titles (two individual, two relays) and wrote his name all over the record books.

The Texas A&M senior turned heads at the Razorback Invitational in late January, when he recorded one of the quickest lead-off legs of an indoor 4x400 in world history. He shot out of the blocks in 44.96 and helped Texas A&M lower the collegiate record to 3:02.52.

By the end of the indoor season, Kerley did quick work of the open 400 as well. He went undefeated at that distance on his way to the NCAA title and clocked three of the fastest times in collegiate history, of which included the No. 3 mark of 44.85, the No. 5 mark of 45.02 and the No. 8 mark of 45.10.

Outdoors, Kerley kept that momentum going and attacked the record book. The senior tallied four top-10 times in the open 400 – including the collegiate record of 43.70, the No. 3 mark of 44.09, the No. 4 mark of 44.10 and the No. 10 mark of 44.30. He paced the Aggies to a collegiate record in the sprint medley and helped them to a pair of all-time top-10 marks in the 4x400 while winning two more NCAA titles (400, 4x400).

LINDON VICTOR
TEXAS A&M

Record-breaking decathletes love the Texas Relays for some reason. Nearly 11 years to the day that Trey Hardee topped Tom Pappas' collegiate record in Austin, Texas, Victor upped the ante at the same meet. Victor put up a Day 1 collegiate scoring record of 4516. While he slowed a bit on day two, by the end of the two-day competition he had amassed 8472 points, seven more than Hardee did in 2006.

Less than two months later, Victor returned to the multi-scene in Columbia, South Carolina at the SEC Outdoor Championships and demolished his own record. This time he answered a slow start on the first day and broke the Day 2 collegiate scoring record. Victor totaled 4174 of his 8539 points in the 110 hurdles, discus, pole vault, javelin and 1500. In fact, it was in the discus where he improved his own collegiate decathlon discus record to 55.22m (181-2).

Victor capped his senior season with a NCAA decathlon title and notched the second-best score in meet history in the process (8390). The Grenada native won by 209 points, the largest margin of victory since 2010 when former The Bowerman winner Ashton Eaton set the bar at a whopping 656 points.

Lindon Victor is the owner of the No. 1, No. 2 and No. 7 marks in collegiate history based on his work in 2017 alone.

FINALIST 2017

MAGGIE EWEN
ARIZONA STATE UNIVERSITY

Maggie Ewen had a season for the ages in 2017, where she was the top overall point scorer in the NCAA Division I Outdoor Track & Field Championships thanks to three All-America performances in the hammer (first), discus (second) and shot put (sixth). She also set the collegiate outdoor record in the hammer.

The Arizona State junior burst onto the scene after her performance at the Baldy Castillo Invitational in mid-March. It was in Tempe, Arizona, where Ewen launched the hammer 72.71m (238-6) and moved into second place on the all-time collegiate chart behind former Georgia standout Jenny Dahlgren.

Less than three months after setting the American collegiate record, Ewen swept the discus, hammer and shot put titles at the Pac-12 Championships (becoming just the second thrower in conference history to do so). She also pushed her efforts from the Baldy Castillo Invitational down to third on the all-time chart thanks to a heave of 72.81m (238-10) at the Duel in the Desert in mid-April.

No throw by Ewen left more of a mark on the 2017 outdoor season than her third attempt in Eugene, Oregon. She hurled the hammer 73.32m (240-6) to shatter Dahlgren's 10-year-old standard. Her 21 points in Eugene accounted for all of the Sun Devils' total, placing them 10th.

Ewen now owns the No. 1, No. 3 and No. 4 marks in collegiate history – all from her performances this year.

KETURAH ORJI
UNIVERSITY OF GEORGIA

A year after setting the collegiate outdoor record and the American outdoor record in the triple jump, as well as placing fourth at the 2016 Rio Olympic Games in the triple jump, Keturah Orji was back for more in 2017.

Orji, a finalist for The Bowerman a year ago, rewrote the indoor record book this season with a historic series at the SEC Championships. She recorded identical No. 1 marks of 14.32m (46-11¾) that double as the American record and collegiate indoor record, the No. 3 mark of 14.28m (46-10¼) and the No. 6 mark of 14.20m (46-7¼).

The Georgia junior took some time off after winning her second NCAA indoor title in a row and made her outdoor debut nearly two months later at the Torrin Lawrence Memorial, where she notched the No. 2 mark in collegiate outdoor history (14.31m/46-11½) on her first attempt.

Orji rolled through the rest of the outdoor season, completing the indoor-outdoor sweep of the triple jump titles once again while adding a runner-up finish in the long jump, finishing three-quarters of an inch behind teammate Kate Hall at NCAAs.

She totaled 18 points in Eugene to bring her 2017 total to 34, which accounted for 30 percent of Georgia's 113.2 combined points at NCAAs.

Orji is just the fourth woman to be a two-time finalist for The Bowerman.

RAEVYN ROGERS
UNIVERSITY OF OREGON

Raevyn Rogers was on top of the world in 2017, as the Oregon junior cruised to her second sweep of the NCAA 800m titles while altering the collegiate record books both as an individual and part of Oregon's relays.

Rogers and her teammates started things off with a record-breaking performance at the Columbia East-West Challenge where they lowered the distance medley relay standard. On the 800-meter leg, Rogers split 2:03.53 (Oregon's final time was 10:48.77).

Rogers then took aim at the collegiate outdoor record book, specifically the 800-meter standard of 1:59.11 set by Suzy Favor in 1990. Rogers coveted that record since her freshman year and finally knocked Favor off her perch as she clocked a time of 1:59.10 at the Mt. SAC Relays to win an elite section stacked with professionals.

She anchored two relay teams to collegiate outdoor records – one of which has since fallen (sprint medley) – but the one that remains on top fittingly made double history at Historic Hayward Field.

First, it lowered the 4x400 record to 3:23.13 (Rogers split 49.77). Next, she held off Southern California's Kendall Ellis to give Oregon 10 huge team points that secured the outdoor title and assured the Ducks the first women's Triple Crown in NCAA DI history.

To go along with all of those records, Rogers racked up First Team All American honors for the Indoor 800m and 4 x 400 relay as well as the Outdoor 800m and 4 x 400 relay.

ALL PHOTOS BY KIRBY LEE


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