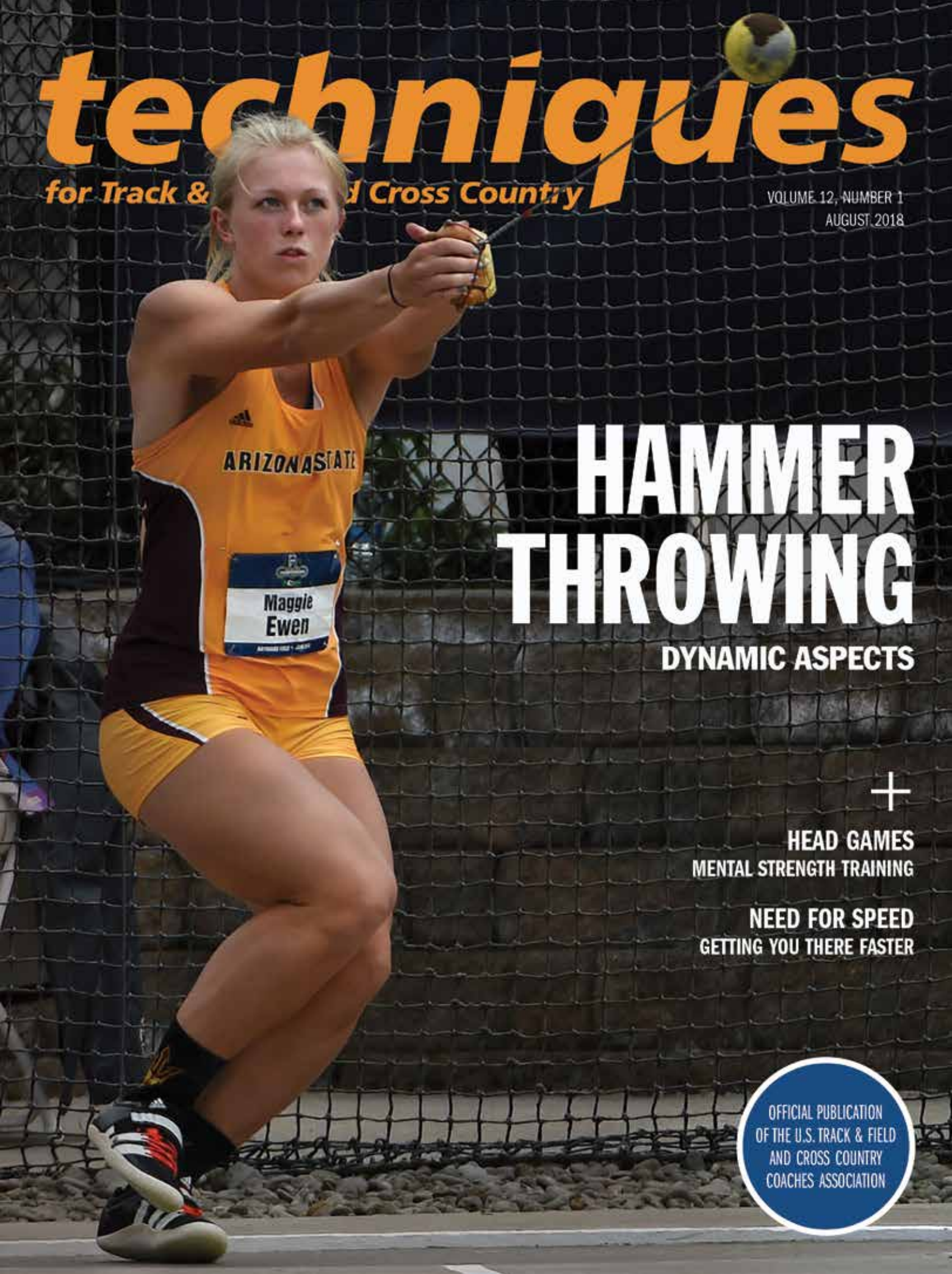

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for Track & Field Cross Country

VOLUME 12, NUMBER 1
AUGUST 2018

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DYNAMIC ASPECTS

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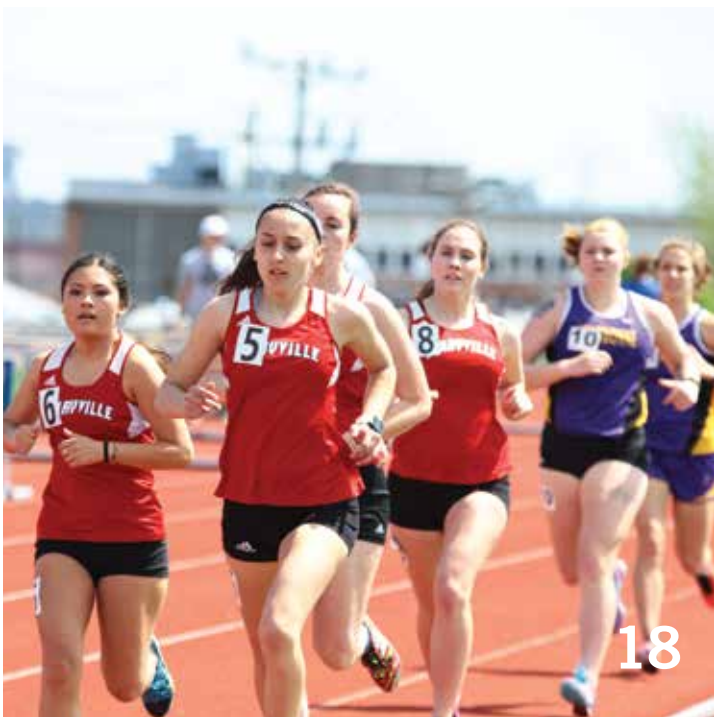

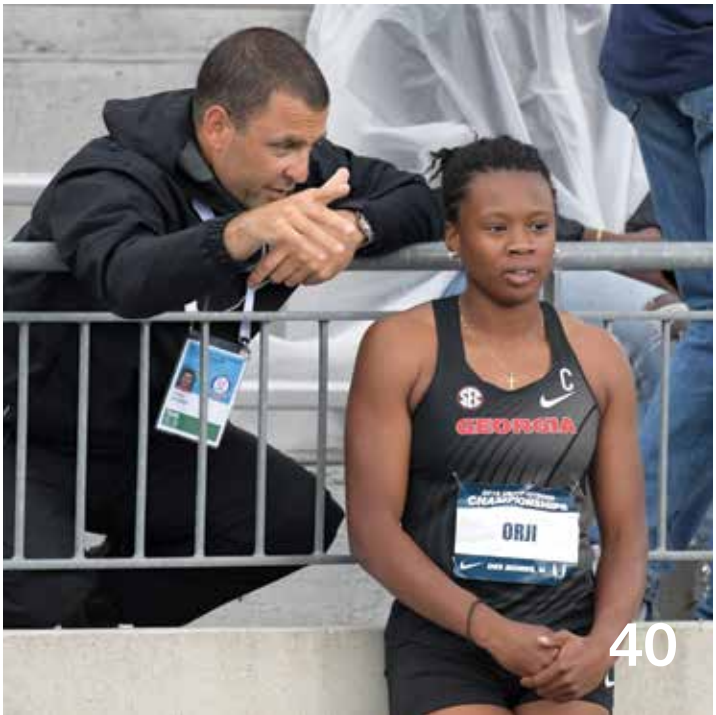

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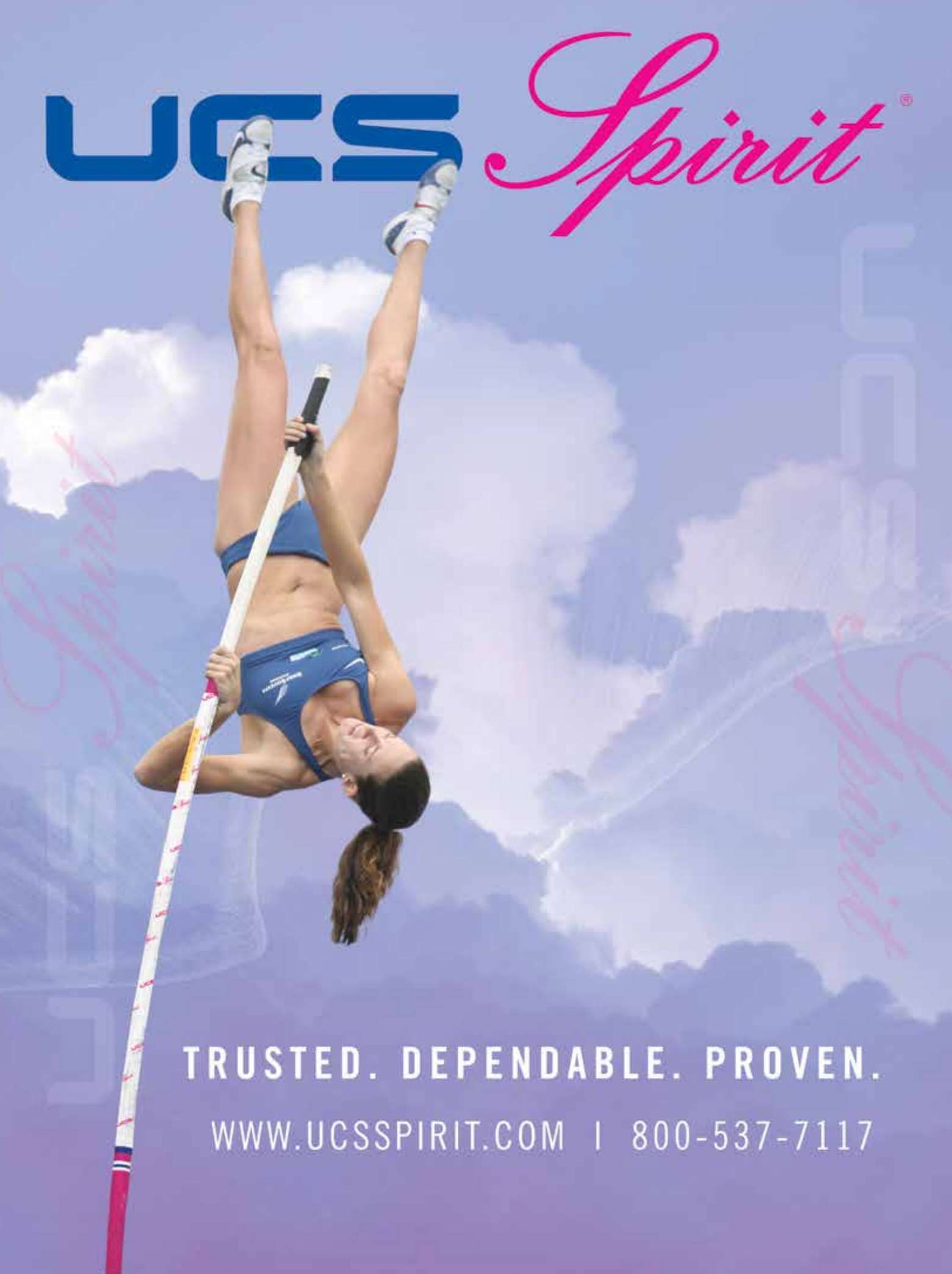
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A LETTER FROM THE PRESIDENT

As summer ends and we prepare for the start of the Cross Country fall season, I want to commend our coaches who took time this summer to improve their knowledge and skills as a professional coach. Over 150 coaches attended the USTFCCCA Track & Field Academy Specialist Certification courses this summer, and 105 coaches attended the Strength and Conditioning Course in Naperville, Ill. The upcoming USTFCCCA Convention will provide another great opportunity for all of us to engage in developing our depth and breadth of knowledge. We have an all-time high of twelve Track & Field Academy courses scheduled during the Convention, with opportunities for coaches to engage in multiple courses on the front and/or back end of the Convention. See the back cover of this issue for a complete list of courses being offered.

Over the summer, we announced the 2018 men's and women's finalists for The Bowerman, and this may be one of our most competitive groups of finalists in the ten-year history of the award. On the women's side, our finalists are Maggie Ewen (Arizona State), Sydney McLaughlin (Kentucky) and Keturah Orji (Georgia). On the men's side, Rai Benjamin (Southern California), Grant Holloway (Florida) and Michael Norman (Southern California) are our finalists. Thank you to all of you who participated in our USTFCCCA member voting or our fan voting this summer. We smashed all previous records for fan voting on both the men's and women's side, with over 110,000 votes recorded between the Men's and Women's Finalists. The winners of The Bowerman will be announced at the 2018 USTFCCCA Convention in December.

In other awards news, we're putting the finishing touches on our 2018 Hall of Fame class as this issue goes to press, and I'm sure you are as excited as I am to welcome another outstanding class into our coaching Hall of Fame at the 2018 USTFCCCA Convention.

It's a great time to start making plans to join us at the Convention this year. The 2018 USTFCCCA Convention will be held December 17-20 at the JW Marriott Hill Country Resort and Spa in San Antonio, TX. Visit our website at www.ustfccca.org for convention details, registration, hotel information, and more. The work we do at our Convention, and the time that we spend developing ourselves as professional coaches, is of the utmost importance to our sports and to our student-athletes.

With Cross Country season upon us, I wish you and your teams a healthy and productive fall season, whether you are on the Cross Country course or beginning your preparations for the indoor track and field season. I hope you'll check the USTFCCCA website frequently throughout the fall for ongoing coverage of the Cross Country season, regional and national rankings, and postseason awards. All the best to you and your teams as we kick off the fall!

DENNIS SHAVER
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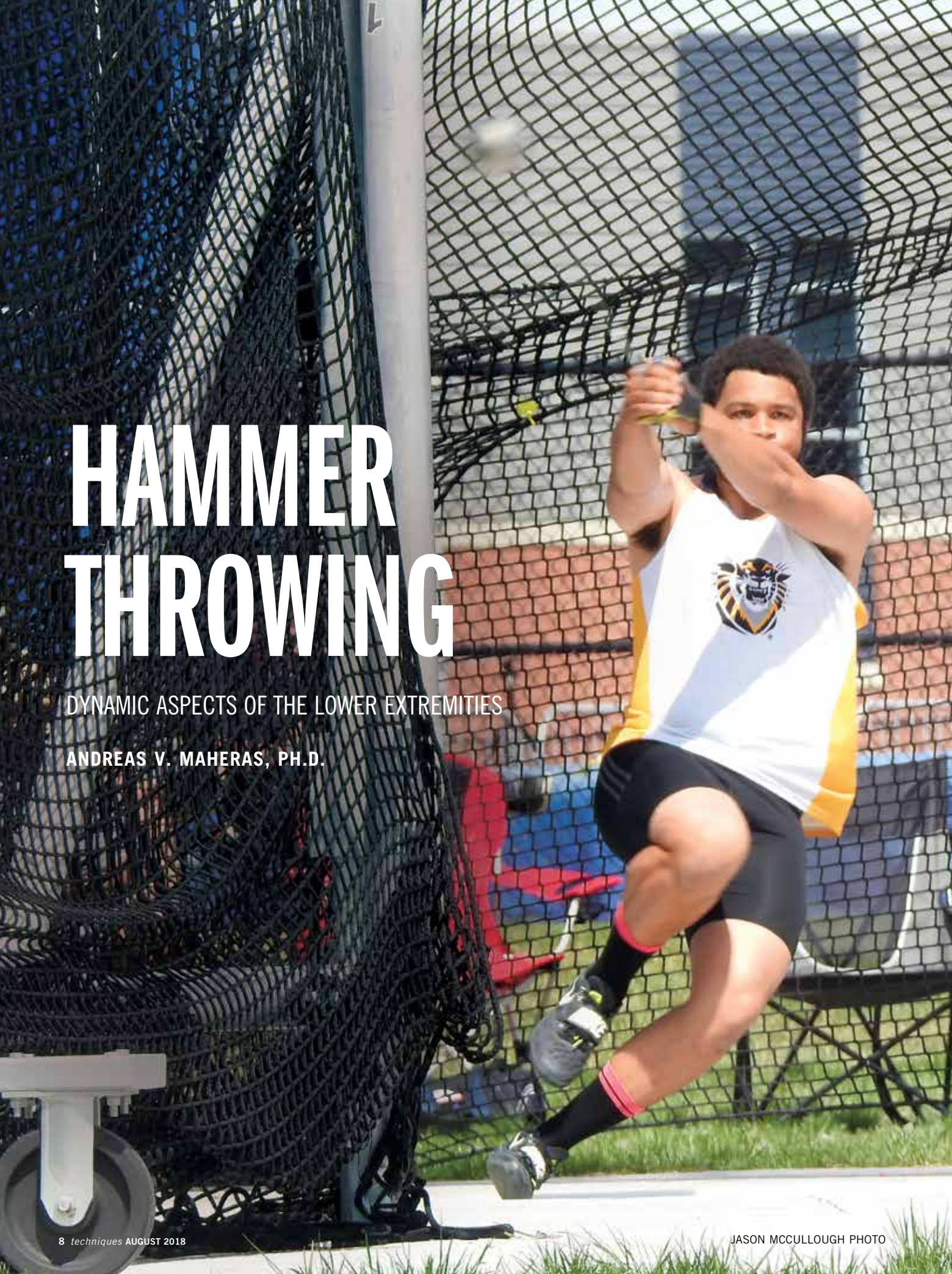

HAMMER THROWING

DYNAMIC ASPECTS OF THE LOWER EXTREMITIES

ANDREAS V. MAHERAS, PH.D.

JASON MCCULLOUGH PHOTO

During the course of a hammer throw, the thrower will turn with the hammer three or four times alternating between double and single support. In this fashion, the left foot is always in contact with the ground. The right foot spends a good part of the total turn time off the ground, the actual time depending primarily on the skill of the thrower and also the order of a particular turn. The forces exerted by the feet on the ground will allow the thrower to, in turn, successfully impart the optimum amount of force on the hammer itself. An observation of the action of the right foot in hammer throwers will show that some prefer to execute a "stomping" action, as that foot comes in contact with the ground to complete a turn, while others choose to bring it in contact with the ground in a "softer" or neutral fashion during that phase. The action of the feet, and particularly the right foot, from a dynamic point of view, will be discussed below.

VERTICAL FORCES AND LINEAR IMPULSE

Given that the forces exerted during the turns are mostly on the vertical (Murofushi et. al, 2007), a rudimental examination of those forces follows. Figure 1 shows the vertical force exerted on the right and left feet during a turn. The force exerted on the right foot shows a big spike just after landing, but it is generally so brief, approximately 30 msec., that it will only have a small effect on the generation of angular momentum. What matters more in this figure is the (non-shared) total area under the curve which is shown in blue color for the right foot and gold color for the left foot. This is the linear impulse. In the course of the entire double-support (i.e., the period when the vertical force on the right foot is not zero), the area under the curve is similar for the right foot and for the left foot. Initially, the vertical force exerted on the right foot gets a big value (the spike mentioned before). This force then drops almost immediately, and more or less reaches the same value as the vertical force exerted on the left foot. But then it increases again and becomes again clearly larger than the vertical force exerted on the left foot. This continues until roughly half-way into the double-support phase. Then the two forces stay about even for a little bit. Finally, the vertical force received by the right foot drops off a lot, as this foot begins to unload (begins

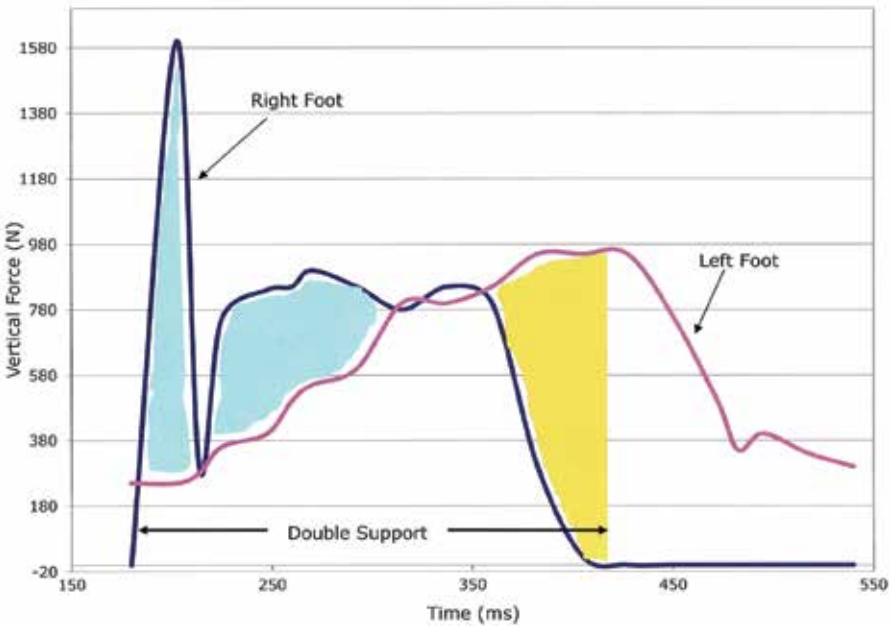

Figure 1. Vertical forces and linear impulse during a turn in the hammer.

to gradually lose contact with the ground), and thus in the final 20-30% of the double-support phase the vertical force received by the left foot becomes much larger than the vertical force received by the right foot.

In the early part of the double-support phase the area under the curve is larger for the right foot than for the left foot (blue-shaded area in figure 1), while in the late part of the double-support the area under the curve is larger for the left foot than for the right foot (gold-shaded area in figure 1). Overall, the blue area compensates for the gold area, which means that both feet receive about the same total amount of linear impulse from the ground during the double-support phase. So the average force received by both legs is about the same. So what is happening during the double-support phase according to this graph, is either like what is shown in the top one in figure 2, (which would imply no gain of vertical angular momentum), or it could be like what is shown in the bottom of the same figure (which would imply a gain of vertical angular momentum by having the c.m. closer to the vertical of the right foot than to the vertical of the left foot). In both cases the assumed vertical force is the same for both feet, i.e., 600 N, but it is impossible to know which of the two (top or bottom image in figure 2) is the case in reality, because we don't know where the center of mass was. In all this discussion, the important element is that the eventual total torque should generate a counterclockwise rotation about the horizontal axis as discussed below.

AXES OF ROTATION AND MECHANISMS OF FORCE GENERATION

During the execution of the turns, the thrower rotates around both a vertical axis (horizontal rotary momentum) and a horizontal axis (vertical rotary momentum), see figure 3, with the majority of the momentum being developed around the horizontal axis (Dapena, 1989, 1984). The right foot's action will primarily generate the rotation about both of those axes, that is, throwers should keep separate in their minds as to what the right foot provokes through its vertical action and what it provokes through its horizontal action. Ideally, a thrower would want as much rotation as possible both about the vertical axis and about the horizontal axis. Hammer throwers therefore, make backward horizontal forces against the ground with their right foot during the turns. Those horizontal forces can be compared to the horizontal forces the rider of a scooter would make to roll forward although the resulting movement in this case is linear as opposed to rotational. We know that horizontal forces do exist because the angular momentum about the vertical axis does increase somewhat during the turns (Dapena, 1989). Doing the "scooter technique" with the right foot is good for achieving hammer speed, but as it happens in the discus throw, it's harder and harder to achieve as the speed of rotation increases in the course of the turns (Rohas-Ruiz, & Gutierrez-Davilla, 2009).

Similarly and more importantly, hammer throwers also make vertical forces around the horizontal axis. What needs to be emphasized and reiterated here is that the majority of the forces exerted on the thrower during the turns are on the vertical or around the horizontal axis. One should also be aware of the mechanism as to how the hammer thrower manages to actively accelerate the hammer to the left during the turns. The two mechanisms are as follows:

First, the thrower presses harder on the ground with the left foot than with the right foot and/or second, the thrower generates vertical forces on the ground with both feet, but keeps the center of mass of the thrower-hammer system closer to the right foot than to the left foot, instead of half-way between them (figure 2; also for a more detailed explanation see Maheras, 2010). According to those two mechanisms, the net effect, the difference between the two directions, is necessarily a total torque pointing clockwise, from the thrower's point of view, counterclockwise from the viewer's point of view, which effectively tends to cause the thrower to rotate around the horizontal axis in that direction, which is towards her own right. From this position, if the thrower accidentally let go of the hammer, she would fall towards her right side. However, the thrower does not let go of the hammer and by pulling on the cable, she will give the hammer an upward acceleration. The eventual practical benefit of the cooperation between the forces exerted by the feet is to create a counterclockwise torque which will enable the thrower to pull harder upward on the hammer during the upward part of the hammer trajectory resulting in an even greater upward acceleration due to that pulling (Maheras, 2010, 2018).

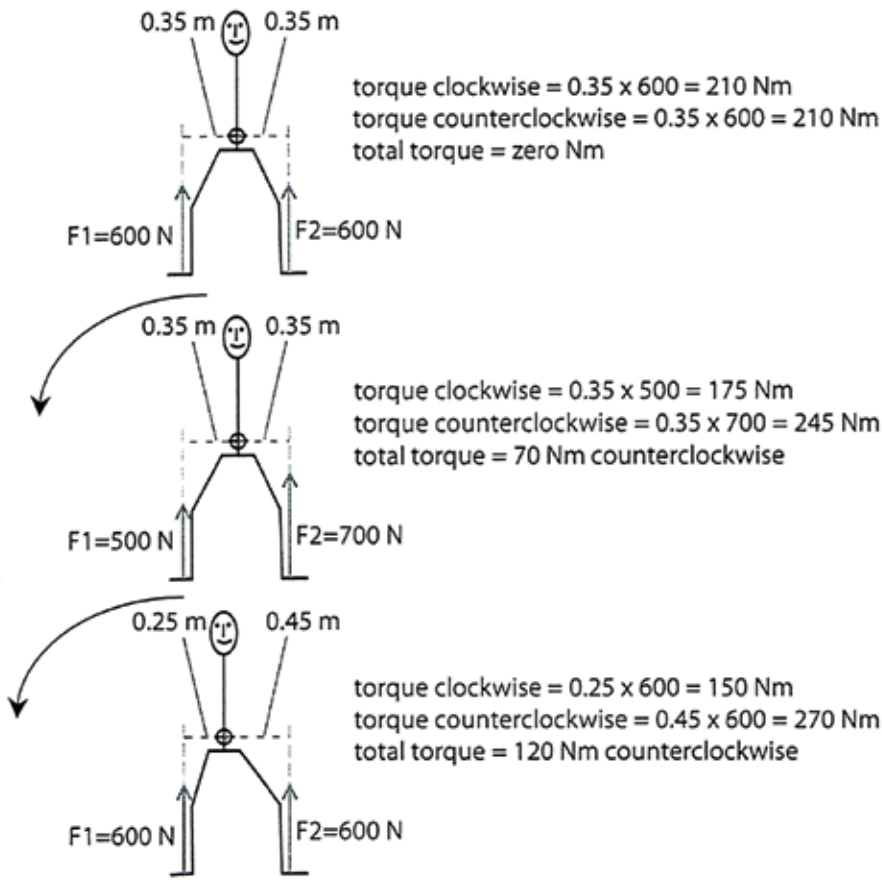

Figure 2. Generation of rotary momentum around the horizontal axis during double support. This axis would be perpendicular to the page and is passing back and forth through the center of mass (circle above hip area). The arrows show the desired, counterclockwise, direction of rotation around the horizontal axis.

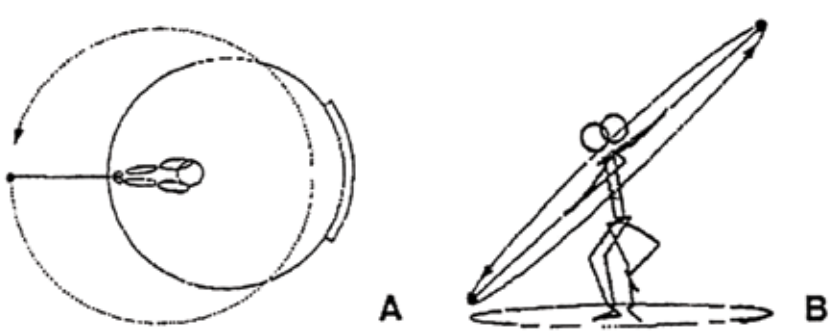

Figure 3. Rotation of the hammer+thrower system around a vertical axis (left, view from top), and a horizontal axis (right, view from the side). The horizontal axis is passing along the AB direction through the center of mass of the thrower.

RIGHT FOOT ACTION

Going back to the action of the right foot which in some throwers can be termed as "stomping" of that foot, it follows that such an action may increasingly, or exclusively, cause the thrower to generate a clockwise torque which will be detrimental to the amount of torque generated counterclockwise. In such a case the "stomping" of the right foot will not be about gaining angular momentum around the horizontal axis, instead "stomping" will make the thrower lose angular momentum about the horizontal axis aligned with the direction of the throw. Ultimately, this is bad for the generation of hammer speed. If the athlete "stomps" the right foot (i.e., if she makes a big downward vertical force on the ground with the right foot), the ground responds by making a big upward vertical force on the right foot. This reaction force, since it is exerted on the athlete is the one that counts for estimating in which direction the athlete is going to be made to rotate. If the athlete-plus-hammer is already rotating counterclockwise, a "stomping" action will subtract counterclockwise angular momentum from the athlete-plus-hammer system (Dapena, 2018).

Except for the double support, of course, vertical angular momentum is generated during single-support, because the support foot (the left foot) gets a counterclockwise torque from the ground, and the right foot gets nothing, because it's in the air (for more see Maheras, 2010).

The question then arises as to why would anyone stomp hard at all with the right foot as many throwers of various abilities do? It could be that some throwers feel that they need to do this in order to stop their body's fall after the rather small amount of vertical support that they got from the left foot during the single-support phase. Notice in figure 1 how small the vertical force received by the left foot is during the single-support phase, particularly near the end. Just like the brevity of the right foot spike implied that the stomp probably did not have a big negative effect on the generation of vertical angular momentum, it probably also will not have a big positive effect on stopping the downward translation of the body c.m. But something is better than nothing, so some throwers will do it. In addition, it is also possible that the throwers may

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"stomp" the right foot as a result of their intention to plant that foot quickly on the ground as they attempt to accelerate the turning motion.

CONCLUSIONS

From a purely dynamic point of view a hard vertical stomp of the right foot would not have a positive effect on the generation of vertical angular momentum around a horizontal axis. If anything, it should have a negative effect on the generation of that angular momentum. On the other hand, the negative effect would probably not be very big because the stomping produces that very sharp but also very brief initial spike in the vertical force, which due to its brevity does not have a big effect. All in all, stomping or not stomping with the right foot probably does not make a lot of difference for the result of the throw.

Given the above, theoretically, the best way to develop as large rotary momentum as possible about both a vertical and a horizontal axis, would be to plant the right foot quite lightly on the ground, not making a very big vertical force with the right foot (i.e., not stomping), but pulling backward horizontally very hard with the right foot (i.e., doing the "scooter" action mentioned above).

In case the thrower is able to both "stomp" and, as she does that, also manages to direct that "stomp" backwards to horizontally pull with the right foot, instead of vertically, that would be desirable as it will enhance the rotation about the vertical axis. However, the thrower will still need to make a reasonable amount of downward force on the ground, pressing down on the ground with a reasonable amount of force, or else she could lose her balance.

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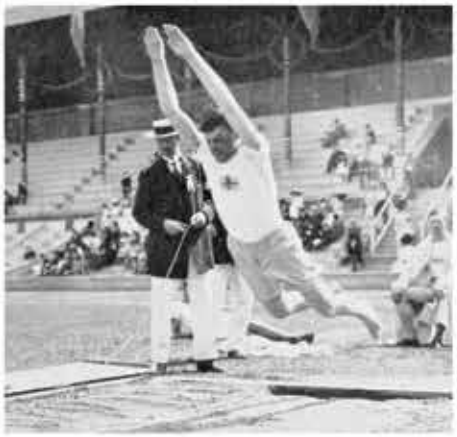

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RACING STRATEGIES AND TACTICS

FOR OUTDOOR MIDDLE DISTANCE EVENTS

TIMOTHY MAKUBUYA AND MICKY KAUFMAN

MARYVILLE UNIVERSITY ATHLETICS PHOTO


MARYVILLE
MARYVILLE
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Athletes of all kinds are often challenged when deciding racing strategy and tactics for particular races. Obviously, no one suggestion will allow the athlete the ability to wane off the pressure often arising from the adrenaline that is secreted prior to the start or firing the gun. However, the decisions made from the start to the finish can have significant impacts on the outcome of the race. These decisions are often what dictates following conversations of regret or rejoice that these athletes have at the conclusion of their races with their coaches and teammates. Racing strategies and tactical decisions are tough to make for many athletes in the race, and require education and practice to become competent and confident. Through various ways, coaches can help their athletes in applying strategies that work best. Adhering to a certain routine and becoming confident with the results of a particular strategy is beneficial, but there may be times where athletes need to abandon what they are used to if they want to optimize their success. In this article, we offer suggestions on how coaches and athletes can utilize common racing strategies (which we will define as a general race plan) and race tactics (which we will define as specific actions) in middle distance events. The key to this however, is for the athlete to try out and figure out what works well for them based on how the race unfolds as well as the strengths and weaknesses possessed by themselves and their opponents.

STRATEGIES

Our approaches are governed by constantly trying out different racing strategies, such as front running, sit and kick and time trial.

FRONT RUNNING

Front running normally involves a runner who takes the lead during the first third of the race and pushes their pace with the confidence that they can sustain the effort better than the other competitors. The goal here is to have their competitors too far back or have them fatigued to the point where they are unable to use a strong finishing kick or end spurt to win the race. There are numerous athletes who strongly believe in this technique. To them, front running with an intention to run a positive split, would serve them best. We can also term this approach the, "catch me if you can" strategy. This strategy can be employed successfully by athletes who believe that they do not have the strongest finish in the race or by those who feel the race is too slow to obtain their goals in the race. David Rushida won a gold medal in the 800m while setting the Olympic record in 2012 finals while using this strategy.

SIT AND KICK

The sit and kick strategy involves a runner who positions him or herself in contention, but not in the lead throughout the majority of the race, allowing other runners to expend additional mental and physical effort, while conserving energy themselves. This strategy involves a runner who picks a point in the last half of the race, with a goal to take the lead. This strategy is employed by athletes who believe they have the strongest finishing kick in the field. The 2016 Olympic 1500 meter Women's finals is an example of a race where the winner, Faith Kipyegon, demonstrated a successful use of the sit and kick strategy.

TIME TRIAL

Often, we have noticed athletes trying to set records utilizing what we have termed the time trial strategy. This strategy will many times utilize a rabbit for pacing purposes that tries to run as even of a pace as possible through the first three-fourths of the race without much variation in speed and target to kick to a personal best. This strategy is perceived by many as being the best opportunity for energy efficiency in the 1500m and 3000m middle distance events. Hicham El Guerrouj used this strategy in 1999 to set the world record in the mile running lap splits of 55.6, 56.0, 56.3 and 55.2.

Athletes may display a combination of these strategies which allows them to mentally process the race based on their physical strength and the race situation that is determined by the strategies of the other runners. In each of these strategies, the goal is for the athlete to determine what would best serve his or her ability to achieve the goals of the race. Examples of racing goals may include; running a season best, winning the race, or obtaining a qualifying mark.

TACTICS

For purposes of building a practical discussion on the importance of some specific race situations that we believe are under communicated, we want to reflect and highlight a few of the many tactics that can help an athlete succeed.

START

In middle distance events, the starting strategy and position is an important aspect of the race. It is our belief that training the start is a much underutilized aspect of training in many running programs. Often, we see athletes that lose precious tenths of a second on the start that severely hampers their positioning in the beginning of the race. There are a couple of things to note at the start of the race. First, are the arms. Many athletes will start with the same arm and leg forward at the start of the race, then when the gun goes off, the arms will do a quick switch of arm position, even before the body is moving forward. In this case, the athlete will lose time and/or distance on his first step in the race. The athlete's arms should start in a position so they can make one big arm swing with their first step with a less exaggerated arm swing than that of a sprinter coming out of the blocks. Athletes also loose time by starting their wrist watch. Starting a watch in a race hampers the ability of the athlete to perform necessary arm motion at the beginning of the race. In this case, the athlete has both arms in front of their body which will cause them to loose of the effectiveness of their first arm swing.

Secondly, we look for the weight distribution on the legs and how the first step is made. It is important that the majority of the athlete's body weight is on the front foot. This will provide a bigger load for the athlete on that leg that will make longer quicker initial steps in the race. A common mistake that runners make at the starting line is having a distribution of weight that is almost evenly split. This may cause the runner to take their first step with the

front foot or in some cases even a small backwards step with the front foot before moving forward. A slightly slower start or loss of distance off the first step causes the athlete to have to expend more energy later in the race in an attempt to regain that position. This will cause the athlete to run subsequent extra meters over the duration of the race because of not having a spot on the turn near the curve on the first lap.

CUTTING IN

Races that use a cut-in line also allow for a certain type of tactics. It is overwhelmingly assumed that running a straight line from the break to the turn is the best way to run the race so that an athlete is running the shortest possible distance. However, this may be short sighted. Whether running in lanes, alleys, or off a waterfall, by starting to run a straight line to the turn could end up costing you extra distance later on. Typically, what we notice in high school and college races is that very few runners will run the straightest line especially when the race is so packed that there is more competition between the start to around the 50 meter mark. Obviously, it should be every runner's goal to run the shortest distance, and this might require a sprint to the lead or tuck in last place so they are not running extra distance on the turn. If they are the last one to complete their cut-in, they will likely be stuck on the outside of the group unless they are in first or last place. The advice here is to keep this in mind as you develop your overall race strategy and to practice cut-ins, as it may not be beneficial to always run the straightest line off the break line.

If a runner is in the first position or alley this provides some other challenges or factors to consider. We suggest that runners that draw inside lanes to stay off the rail or inside line at the break. The other seven to twenty runners will soon be coming in trying to share that space with the possibility of boxing that runner in, cutting them off, or making contact to disrupt the rhythm they have set. Running off the rail in the middle to outer portion of the first lane will allow the athlete a little more movement and a lesser possibility of being negatively affected by these issues in the moments after the break. This may cost the athlete extra distance at the beginning, but it could also save them extra distance as the race goes on.

LANE POSITIONING

Two discussions on lane positioning in middle distance events include; being "boxed-in" while running on the inside of lane, and running on the outer side of the learn. First, being boxed is a term that is used when a runner has athletes both directly in front of him/herself, and to their right. This impedes them from being able to improve their positioning without slowing down to go around and accelerate. Most athletes are typically taught that being boxed in a race

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is a detriment and therefore, try to get out of the box as soon as possible. This will occasionally cause athletes to make unnecessary energy wasting surges in a race, or run in outside lanes which increases racing distance. It is important for the athlete to know that being boxed is only deleterious if a faster pace than those who are creating the box is desired or if a breakaway commences a head of the boxed-in athlete, in which they would like to initiate a response. However, when considering the latter, odds are that when a breakaway is being conducted, the box that an athlete is in will also break up (not always, but usually). So, in most instances it is encouraged to train your athletes to be patient and allow the box to break up rather than slow down to sprint around if they find themselves in that position.

Alternatively, another way to help avoid being completely boxed is to run on the outside of the inner lane on the shoulder rather than directly behind the competitor. In this case, it usually only takes another small step or two to the outside to avoid a developing box and allow proper positioning to respond or begin a break away.

Also often discussed is running on the inside of lane one, so that you are running the shortest distance. Advice on how to do this will often counter the advice on how to avoid being boxed in. After all, the most likely place to be boxed is in lane one, where an athlete might run the shortest distance. This is where the art of racing and coaching is more critical than the science, and here, many different strategies may be employed with success. The athlete's goal(s) of the meet may need to be predetermined as sometimes the goal is to race for time or race for place. With that in mind, the following rules of thumb should be considered but not necessarily adhered to in every situation. If athletes are in front of a pack or are in a lonely spot in the race it is best for them to stay in the inside part of lane one. If athletes are in a box that is moving at the desired speed, then it is better to be boxed running in the inside lanes than running the same speed unboxed in outside lanes. If an athlete finds themselves boxed in a situation they are ready to make a break, then they should slowly (to avoid contact) position themselves to the outside of the track until an opening becomes available to make their break.

The positioning an athlete at the beginning of the race, could sometimes also offer the necessary advantage especially in seemingly overcrowded races. Every athlete aiming to post a better time, or qualify for a major event would want to be at this advantage to start out as fast as possible and avoid being boxed in. From observing runners who start their 800m at different waterfalls, you will notice that athletes at different posi-

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tions would get through the first curve as fast as possible to avoid getting boxed in. This is a crucial moment when racing for time. Coaches need to find ways to communicate with their athletes on how to avoid being compromised. We also know that in many cases, athletes have little influence of starting positions, especially when positions are predetermined by the starter. In the 800m race that starts on the lane or staggers rather than the water fall, the athletes would still have to cross over as fast as possible to aim for front or leading positions on their first back stretch.

HALF WAY

Although the time one crosses the midpoint of the 800m race doesn't necessarily determine how fast they will cross the finish line, we could learn a lot from techniques we apply to pass through this midpoint of the race. From examples that we have used, it's evident that there are mainly three types of 800m athletes; those who go through as fast as possible, and those who slowly pickup their paces, and build into the final end, and those who simply just hang on. It is similar to note that at this point in the race, most these athletes have similar biomechanical display of form, posture, arms swings and leg actions that are positioned in a way to improve running economy. Running posture at this point still allows the smooth motion of the body without wasting lots of energy. It is very rare that an athlete would vigorously swing their arms as if they were finishing a sprint race at this point. At this point in the race too, athletes need to make a decision on when they will start kicking.

FINISHING KICK

There are a few factors to consider when deciding when to start your finishing kick. Strength and weaknesses of the athlete and opponent is the most important. Other factors include the race dynamics (in other words, how the race has played out up to that point), and the goal of the race. The discussion here will focus on a couple of smaller strategies that are underused. One such strategy that can be used when racing for place or a win in a race (while using a basic sit and kick strategy at the end of the race an athlete), can be, being hesitant to decide where to make their final surges to the finish line. Many times athletes will try to wait until a straightaway with 300m or 100m to go in the race for fear of wasting time, distance and energy passing someone on a turn. However, waiting until the straightaway does not give them enough time as the runner in front has that one or two extra step advantage and there may not be enough time to catch them if they have a near equal finishing kick. This approach can be modified to give the athlete a high probability of surpassing the competition. Tactfully waiting or "sitting on the opponent" through the first half of the curve, then proceed to swing to the outside in the second half so that you are just outside of the shoulder (this will also prevent someone from coming up behind you and boxing you in for the finish also), then make the move to pass and start the top speed kick nearing 10 to 20 meters before the straight away (the cue to use here is the 4x1 acceleration triangles). Many times the move to pass is unsuccessful at this time because they are using the outside lane, however if the athlete on the outside lane is keeping up with the runner on the inside lane they will be running faster and as they approach the straightaway, they will start pulling away. Passing that athlete at the beginning of the straight gives a physical edge of being in front right as that athlete starts on the straight and a mental edge of passing another person, while they thought they would not have to run any faster. Obviously, an athlete being passed in the last 100m and then coming back to finish ahead does not happen often. This can be used on either the home or backstretch of the track as well depending on if the attempt needs to be a longer or shorter finishing kick.

As one approaches the last curve of any of these races, they are probably already in their final kicking or sprinting mode, or they are about to initiate the kick. Again, remember, this is dependent upon individual athlete, coaches' direction, and what the athlete can still accomplish.

CONCLUSION

Coaches should incorporate racing practices aimed at allowing athletes to try out the various racing scenarios to determine what works best for them. Such can be be implemented during practice and at time trials, before being executed in an actual race.

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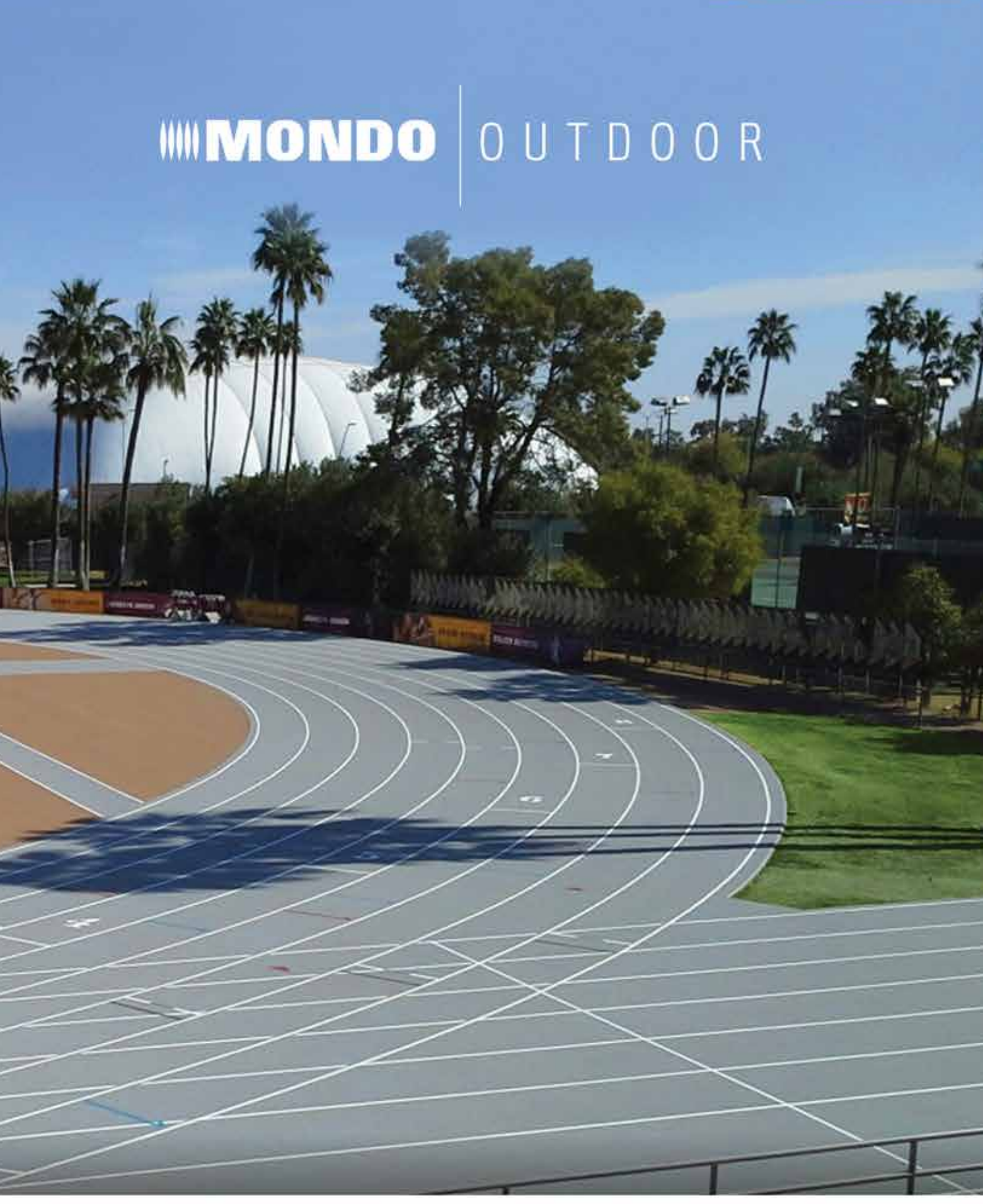

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MARAUDER SPEED

"GETTING YOU THERE FASTER"
A PRACTICAL GUIDE TO SPEED AND SPEED DEVELOPMENT

MIKE THORSON

Spee: Stride length multiplied by stride frequency. It is defined as the ability to perform specific movement in the shortest possible time.

Velocity: The rate of change of motion in a given direction.

GOAL (MISSION STATEMENT)

The goal of any speed development program should be a .01/stride improvement. Example: Time improvement in a 100m dash would be .5s (Seagrave, Speed Dynamics).

SPEED CAN BE SIGNIFICANTLY IMPROVED THROUGH A SYSTEMATIC TRAINING PROGRAM

Speed is both a biomotor quality and a motor skill. Sprinting can be learned through educating the neuro-muscular systems in the body and enhanced through basic learning skills. Speed = A neuromuscular skill. It is in the motor unit where speed begins and must be perfected! The techniques involved in sprinting must be rehearsed at slow speeds and then transferred to runs of maximum speeds. Remember, sprinting involves moving the body's limbs at the highest possible velocity. The stimulation, excitation and correct firing of the motor units make this possible for high frequency movements to occur. This complex coordination and timing of the motor units and muscles must be rehearsed at high speeds in order to establish the correct motor patterns.

Speed development is defined as runs of 95-100% intensity over 30-60 meters, or up to six seconds of running at maximum effort.

Speed is the product of two very basic parameters: stride length (SL) and stride frequency (SF). Of the two, SF, which is measured in single strides per second, is the most important. The Speed Equation: Stride Frequency X Stride Length = SPEED. That equation, however, means very little to your typical sprinter. In layman's terms: The goal of the sprinter is to put big forces into the ground in a short time. The longer an athlete is on the ground the greater the loss of stride frequency.

The Marauder Speed program is based on four key concepts:

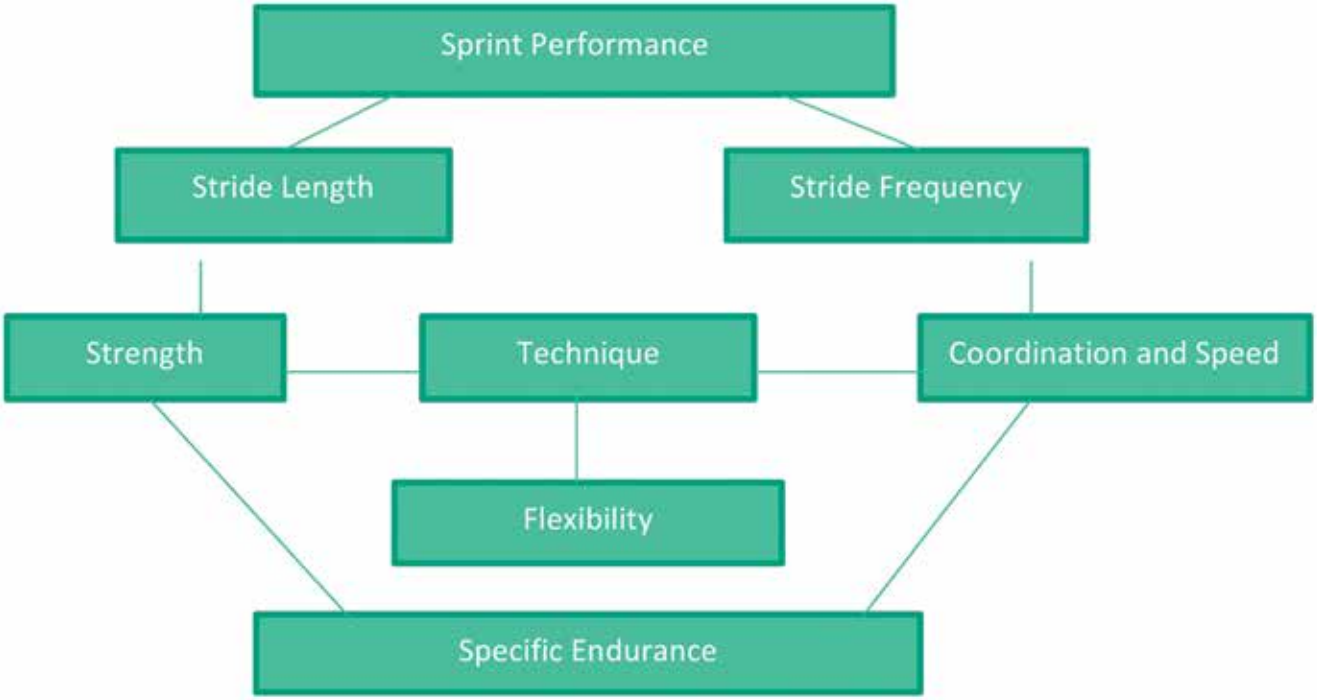
Speed improvement results from training at continuous high, varying intensities! Speed training must be done at maximum speeds with many repetitions to train the correct motor patterns.

Skill development (sprint mechanics) must be pre-learned, rehearsed and perfected before it can be done at high speeds.

Flexibility must be developed and maintained on a daily basis.

An athlete's strength development must be parallel with developments and increases in speed. (Functional strength = SPEED).

SPRINT PERFORMANCE INGREDIENTS



THE BASIC COMPONENTS OF MARAUDER SPEED

SPRINT MECHANICS: An athlete may run only as fast as their technique allows. Only through good sprint mechanics will an athlete function at the ultimate/optimal stride length/stride frequency.

FLEXIBILITY: Only through gaining flexibility through a series of stretching exercises and dynamic warmup drilling can athletes gain the range of motion required for top-level sprinting.

NEUROMUSCULAR (CNS) FIRING STIMULUS: The brain begins all movement patterns by sending impulses to the nerves, causing muscles to contract. Speed gains result from a perfected activation of motor units implemented through correct training.

MAXIMUM VELOCITY TRAINING: Only through brief intervals of maximum velocity will the athlete develop and "educate" the proper motor patterns. "Very fast training" at near 100% intensity is needed if the athlete is to be "fast" on meet day! An athlete cannot ask the body to do something in competition that it hasn't been trained to do. Maximum velocity training needs to occur on a very continuous year-around basis. Remember, "If you don't use it, you lose it."

STRENGTH: can be gained through a number of different means, including regular weight training, body weight exercises, hill running, bounding, multi-jump training, multi-throw training, therabands and plyometrics. Your strength and conditioning program should be based on exercises and drills involving multiple joint actions and movements. Sport skills require multiple joint actions timed or fired in the proper neuromuscular recruitment patterns.

SPEED ENDURANCE: Anaerobic endurance is a key ingredient needed in order for a sprinter to stay at maximum speeds longer and cover longer distances (7-20 seconds, 60-150m). This can be accomplished through interval/repetition training. Example: 2 X 3 X 5 reps with 2-5 minutes recovery/rep/8-10 minutes recovery/set

ACCELERATION: Developing proper leg angles and training an acceleration pattern are essential to speed development. Acceleration mechanics in their purest form involve falling and recovery action with every movement affected by the previous one. The goal is to reach maximum stride with an efficient, trained pattern in a minimum amount of time.

BREATHING PATTERNS: Specific, rehearsed breathing patterns have a significant impact on sprint performance. It has been proven that acceleration and explosion improve when an athlete uses a pattern of inhaling/exhaling. Soviet research has long shown that more force can be produced when the athlete holds their breath. (Valsalva Maneuver)

RECOVERY/REGENERATION: Athletes who are involved in regular regeneration /recovery treatments are able to increase the volume of high intensity work by as much as 40%. Many coaches/athletes do not understand that it can take up to 48 hours to recover from a high intensity CNS/power workout. Sauna, pool, massage, ice bath, massage sticks and form rollers are all useful recovery means. Athletes and coaches should understand too that nutrition, hydration and sleep can play a large role in recovery.

MARAUDER SPEED PRINCIPLES

• Sprinting is the result of neuromuscular coordination; a motor learning process.

• Force production and movement and velocity have to be optimal rather than maximal.

• With higher speeds, the time frame becomes smaller for muscle contraction and relaxation. Thus, it is more difficult for the CNS to distinguish and coordinate the driving forces of extension with antagonistic actions of flexion in leg recovery. It is very important that the agonistic and the antagonistic muscle activities not hinder one another.

• Repetition of this neuromuscular facilitation in the correct firing sequences seems to establish an automatic response in performance. Only through repetition at high speeds can an athlete educate the proper muscle to be used and the order to be fired.

• The neuromuscular recruitment and activation of motor units (skill) is most effectively developed only during fatigue-free seconds of anaerobic alactic work. A sprinter does not only improve performance by activating bigger motor units in greater quantities but by synchronizing their activation to produce a greater rate of force development.

• The base training for speed is SPEED. Thus, it should be trained year-around. Intensity is increased as competitive performances are required, but to neglect speed and technique for several months of the year is a serious mistake. This was often done in the past to obtain so-called "base work" prior to training speed. "If you train slowly, you will be slow." If you want to be fast, train FAST!

• No fatigue can be present when speed training is being implemented. Athletes must have complete or near recovery if the athlete is to receive the maximum training effect. An elite level athlete needs 24-36 hours of rest or very low intensity work prior to a maximum speed training session.

• Develop speed before speed endurance in any session or cycle.

• Increase and decrease intensity to continually stimulate the CNS and avoid the movement stereotype. In other words, vary speeds and train at different intensities. Remember that practice does not make perfect, it makes permanent.

• Emphasize neuromuscular coordination over strength and conditioning.

• Speed should always be trained before strength in any session.

• Acceleration and stride frequency do not develop without strengthening associating muscles to be fast and powerful.

• Always choose exercises that are specific to sprinting and train for performance and not work capacity.

• It is important to stimulate the CNS on a daily basis.

• Medium loads with a fast series of repetitions are typically what are needed for the sprinter. Heavy loads, however, will be needed to aid in the

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improvement of the acceleration phase where power is needed. Remember, however, that too much work with maximum loads and slow speeds will develop muscle memory that is non-productive for the sprinter.

• Choose multi-joint exercises over part movement exercises and optimally in the same firing sequence that a sprinter would employ.

• Train for muscle balance and amplitude of movement. Programs must address all muscle groups and balance in strength development. Many injuries are the result of an imbalance in the antagonist muscles.

• Address postural needs first and foremost. The CORE of the body is critical to performance.

• Employ the same group of exercises long enough for a positive training effect (4 weeks). But not too long to cause a dynamic stereotype or staleness. Athletes and muscles need variety and varied stimulus.

• Don't think that strength work has to be done in the weight room. Sled pulls, tire pulls, Hill running, Hurdle Hops, Multi-Throw/Jumps and Circuits can produce some significant functional strength gains.

• Training can have a huge effect on fast/slow twitch muscle fibers. Although to a degree this is genetic, training can have a huge effect on the recruitment and utilization of the correct fibers. Too much slow endurance work will recruit the intermediate fibers to assume properties of slow muscle fibers. On the other hand, more high intensity training can train the intermediate fibers to take on the properties of fast twitch muscle fibers.

ACCELERATION

Acceleration (defined) the rate of change in velocity. It allows the sprinter to reach maximum speed in an efficient, minimum amount of time. Most sprinters reach maximum speed between 30-60 meters. Very seldom in team sports do athletes go beyond the acceleration phase. They are constantly stopping, starting and

changing directions.

Acceleration may be the most trainable of the speed components.

MECHANICS OF ACCELERATION

Posture: The alignment of the body is critical, with posture being dynamic—constantly changing with every step. Remember the so-called lean comes from the ankle and not the waist.

Arm Action: The arms assist to produce force and aid in balance so that forces can be applied toward the ground.

Arms/Charlie Francis: All sprinting is controlled by the arms according to legendary Canadian sprint coach who is now deceased, Charlie Francis. When neurological pattern was researched it revealed that the arms do precede the legs and the faster the arms move, the faster the legs will in return.

Leg Action: The emphasis is on the backside mechanics—the legs are pushing back behind the body during the first steps/strides. The pushing action begins in the first 4-6 steps, after which a sprinter is attempting to get into the "hips tall" sprint position.

Acceleration Pattern: It is necessary in order to obtain the correct force application and proper transition to top speed to have the proper acceleration pattern. The pattern typically sees each step increasing until full speed is achieved. Many athletes take steps that are too long, hoping to achieve top speed quicker. Typically this causes just the opposite effect.

Force Application: The goal in applying force is to create a positive shin angle so that the foot initially contacts the ground behind the center of gravity. Quite often the opposite occurs, thus a braking action when the foot gets out ahead of the center of gravity and causes a braking action. A coaching cue is to have the sprinter get the foot down as quickly as possible—you can only apply force if the foot is on the ground.

Acceleration Training: Improvement in acceleration is closely linked to gains in power. Gains in power will result in the ability to produce higher amounts of force more quickly, thus decreasing ground contact time. Power (defined) is the rate at which work is done. Work divided by time = Power.

Acceleration Breathing Pattern: The athlete will typically hold breath (the in if you are working in and out breathing) during the acceleration phase before breathing out during the transition to the maximum velocity phase.

Acceleration Drills: There is no substitute for the real thing. Therefore, the best way to train acceleration is to do just that and do not deviate very much from true acceleration work (drills). An example of acceleration work just using the body would be simple falling starts.

DRILLS

- Stick drills (experiment with spacing)
- Harness sprints (moderate resistance))
- Sled Pulls (Always use the 10% rule—the resistance of the sled should not slow the runner down more than 10%)
- React and go drills
- From a 180 degree turn
- From back lying prone
- On stomach
- Drop and go

BALANCE

Balance may be the most neglected component in training. Yet, it is the most important component in athletic training because it underlies all movement. It is a very simple task, but is highly complex when it comes to sprinting.

Balance does not work in isolation when it comes to athletics. Things such as coordination and agility depend on a well-developed sense of balance. The ability for the sprinter to produce force at the right time, in the right plane, and in the right direction, is highly dependent on balance.

Balance and actually sprinting and running involve the body repeatedly losing and regaining control of its center of gravity because a runner (sprinter) is always moving. Balance can be improved through a variety of different sensory exercises.

A mini tramp, K-board, foam blocks or other means of equipment can certainly be used to train balance. But always remember the best equipment is the body itself.

Examples of balance training activities:

- Hurdle Walk/Hurdle Walkovers (Regular and with eyes closed)
- 180 and 360 degree turns/jumps (regular and eyes closed) Also called Half turns/Full turns. Respond to caller's signal
- Green light/Red Light—Stop on one leg each time and hold in a balance position in response to a caller's signal

**Nearly any type of dynamic warmup drill can be used as balance training by merely having the athlete close eyes. Athletes will discover an entirely new sensory experience when drilling with eyes closed.

WARMUP

The warmup prepares the body for the training session, both from a physical and mental standout. It basically reduces the number of muscles that can be strained or hurt along with preparing the body to perform. It can be highly important in rehearsing the specifics of the event if structured and done properly. Skill development can and should take place in the warmup. The Marauder Sprint-Hurdle Warmup (enclosed) not only prevents injuries and prepares the body, but improves sprint mechanics, flexibility, power, balance and strength. Thus, the warmup is a speed development improvement tool in itself.

Different types of Warmup:

- Dynamic Continuous Movement (The Marauder warmup is an example of this)

Static Flexibility (Research has shown that static stretching should be for the most part done at the completion of the workout)

- PNF
- Medicine Ball
- Skipping Rope
- Games (Tag, Relays)

*Editor's Note: The author included a detailed list of two different warmup routines used in his program, however space dictated that those lists could not be included here.

SPRINT MECHANICS

A sprinter is only as fast as their mechanics will allow!

The principal mechanic keys/points:

• The head is held high and level with the eyes looking straight ahead. No rotation of the head with a loose jaw and chin down (Head Steady).

• The torso is erect and in a position of "good" posture. Instruct athletes to run tall with chest up. The body will be nearly vertical at high speeds (slight forward lean in some cases).

• The hand of the driving arm comes up shoulder level (front-side mechanics). Arms should be bent at 90-100 degrees. Hands should drive back 6-8" behind the hips on the backside. Remember that all sprinting is controlled by the arms and that the arms precede the legs. Arms drive the legs!

• The shoulders are relaxed, with the thumbs up and the elbows turned in toward the body. The arms should not cross the mid-section. The shoulders are down—not hunched causing tightness in the upper body.

• The hips are high enough above the ground to allow the driving leg to extend fully to the ground.

• The ankle fully extends at the end of the leg drive. Good knee lift is essential—thigh should be parallel or horizontal with the ground.

• Concentrate on running smooth—no bouncing.

• Ground contact should be with the ball of the foot, behind or slightly underneath the body's center of gravity with an active foot strike. The goal of the athlete should be to impact the ground with a foot that is moving backward—think of a child riding a scooter or skateboard. The foot should be pushing backward before it impacts the surface. Sprinting is a pushing action and not a pulling action. Ground contact for 100-200m athlete should be ball of the foot, 400-800m runner the arch. By contrast, the 1500 meter runner will have ground contact with the entire foot.

• Feet should be straight ahead during foot contact and in the dorsiflexion position (toes as close to shin as possible—cocked)

• Avoid excessive rear-side mechanics (actions). Stress high hips. Problems associated with excessive backside actions:

• Increased recovery time which results in slower step-rate (stride frequency)

• Increased load on the hamstrings which have to assist in the recovery process. Greatly increases the risk of injury!

• Decreased knee lift (front-side mechanics) because knee lift is inhibited when the hips are low and there isn't enough time for them to be lifted higher with the late recovery. This results in less powerful foot contractions.

• Relaxation: All athletes should be striving for relaxation. Focus on using muscles that are required for running and stabilization. Even the face should be relaxed. More importantly, learn to switch off all muscles that are not required as much as possible.

SPRINT MECHANIC TEACHING CUES

• Cocked foot (dorsi-flexion) no dangle

• No butt kick

• Tight back, stomach and butt

• Run tall, Chest up (aids in keeping hips tall)

• Knee up, Toe up, Heel up

• Speed up the arms (Arm Speed)

• Close the angle on the arms (short levers are fast levers)

• Thumbs up and turn elbows in with arms

SPEED DEVELOPMENT EXERCISES/ WORKOUTS/SAMPLES

Maximum Velocity Training

• 3 X 30 m. with blocks/spikes (4 min. Recovery)

• 2 X 3 X 50m. with blocks/spikes (4 min. Recovery/8 min ./ Set)

• 2 X 20m, 30m., 40m. from 3 point/ spikes (4 min. Recovery/(8 min./ Set)

Speed Endurance

• 4 X 150m. @ 98% w/spikes (5 min. Recovery)

• 2 X 2 X 150m. @ 98% w/spikes (5 min. Recovery/10 minutes/Set)

Acceleration Training

• 4 X 40m with standing start (3 min. Recovery)

• 4 X 50m. Hill Sprints (3 min. Recovery)

• Ins and Outs (Breathing pattern work over different distances)

• Block Starts

• Flying 30's

Resistance Training

• Weight vest sprints

• Uphill Sprints

• Sled/Tire Pulls

• Stairs

• Parachute

Assisted Training

• Downhill Sprints

• Towing (Tube/Cord)

**The 10 % rule should be in effect for both assisted and resistance training. No more than 10% of the athlete's body weight should be used when providing overload for resistance. And the time should not be slowed by 10%. The same is true of assisted training: the athlete should not increase speed by more than 10%.

CONTRAST TRAINING

This is one of the best ways to develop pure acceleration and maximum speed. It involves combining resistance training and assisted running followed by the actual race model run ("the real thing" over acceleration or velocity distances).

POOL TRAINING

Pool and hydro therapy has long been used for rehabilitation. It also can be used for recovery and become a part of regular training programs. The pool can be used for strength gain improvement, skill development and flexibility employing deep water intervals and regular swimming.

MENTAL/PSYCHOLOGICAL ASPECTS

One of the trademarks of successful coaches is their relationships with their athletes. Successful coaches understand that coaching at the end of the day involves people, that it involves relationships.

• The goal is to have athletes feel fast and successful

• Create training that has positive

outcomes

• Have a passion for athletes and training (Display that)

• Care!! Show athletes you care about them—on the track and off!

• Develop trust and respect with athletes

• You need to develop the ability to work with athletes that "operate outside of the box." Understand that not all athletes will mark to "your drum."

• Create a positive atmosphere with positive energy

• Make athletes believe that anything is possible and that the key to obtaining goals is proper preparation (PP).

• You as a coach should have goals and they should closely correlate with the athlete's goals. Understand and communicate with each other!

OBJECTIVE

The objective of this sprint article is to provide a practical and simple guide to speed and speed development. It is our goal that we can provide both coaches and athletes alike a basic, yet somewhat technical understanding of speed and what is required to develop and enhance it.

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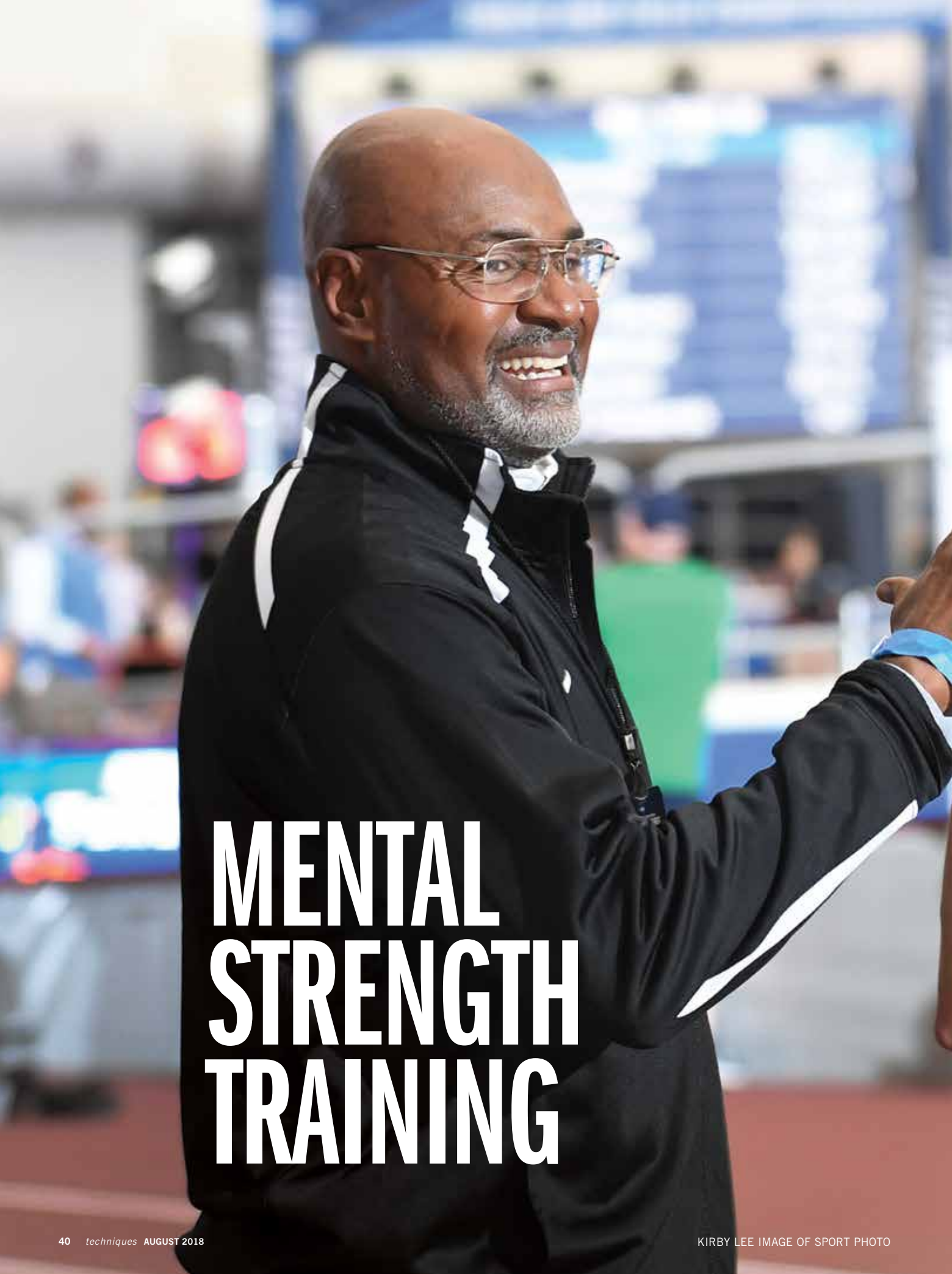
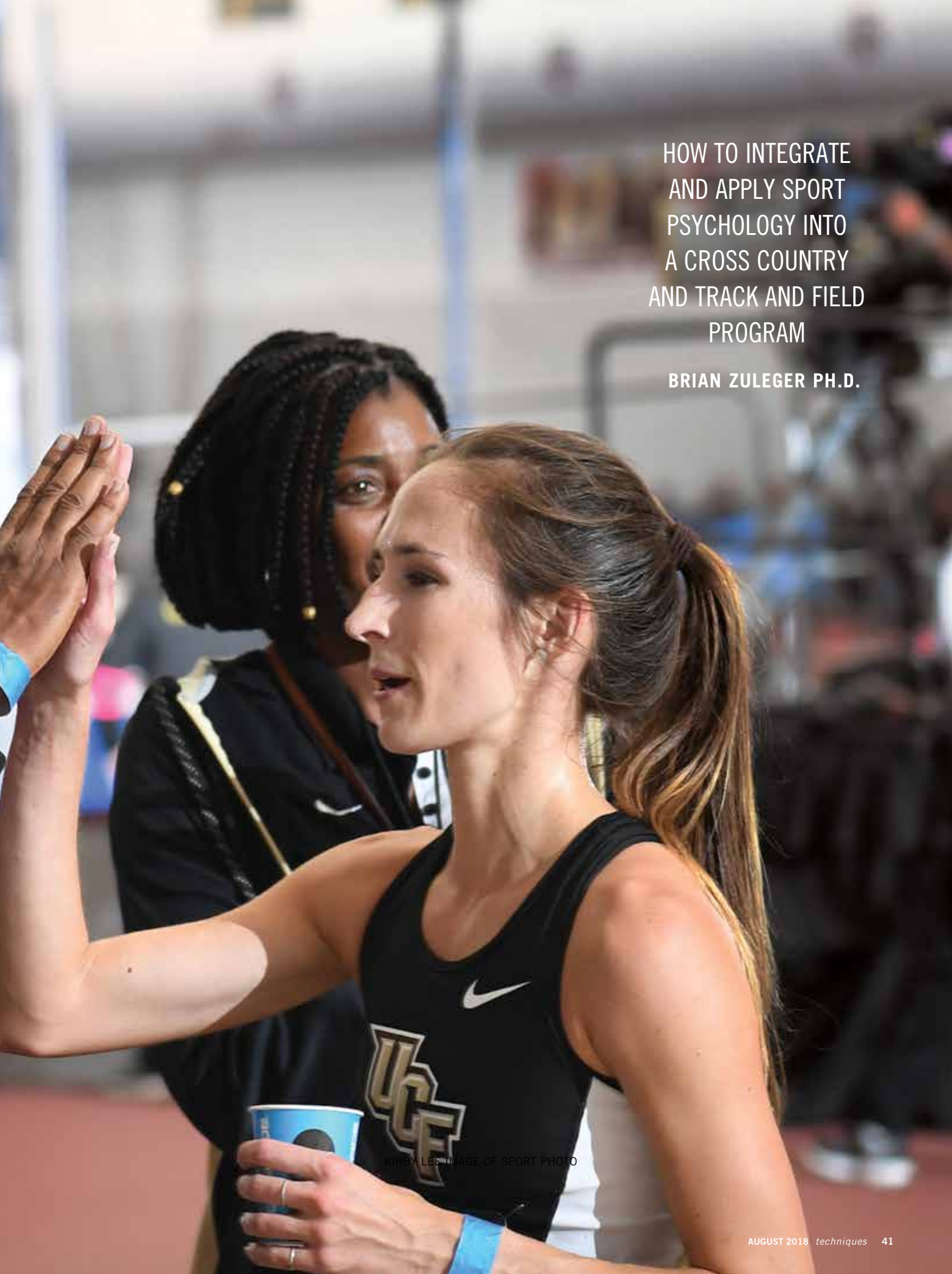


MENTAL STRENGTH TRAINING

KIRBY LEE IMAGE OF SPORT PHOTO

HOW TO INTEGRATE AND APPLY SPORT PSYCHOLOGY INTO A CROSS COUNTRY AND TRACK AND FIELD PROGRAM

BRIAN ZULEGER PH.D.



KIRBY LEE IMAGE OF SPORT PHOTO

"I got a kid who…" this is a common phrase that coaches from all sports and all levels often ask sport psychology professionals. The question is typically about an athlete who is struggling with some aspect of training or competing and the coach believes that the problem may be mental. The problem could be a lack of focus, motivation, commitment, resiliency, poor attitude, etc. This conclusion is often arrived at after the coach has exhausted all other tools in the tool box to try to work with the athlete on improving performance and behavior. At this point the coach may reach out to someone who they trust with knowledge or expertise in sport psychology. The problem is that many coaches, unfortunately, do not have a network that includes a trained expert in the field of applied sport psychology and understands sport science and competitive sport. Unfortunately athletes and coaches often end up talking with people who are trained in counseling psychology or psychology and they also maybe ran a 5K road race over the weekend and market themselves as a "sport psychologist." The problem here is that many times athletes and coaches do not have a good experience with this individual and it turns them off from sport psychology and mental training. To be clear there are people trained in counseling psychology and psychology who are also well trained in applied sport psychology and understand competitive sport and they do great work with athletes and coaches both in counseling and mental training. This article will attempt to provide information and knowledge on how coaches can find and use the expertise of an applied sport psychology professional, how to integrate applied sport psychology into a program and how to obtain more education both formally and informally.

BUILD IT MODEL VS. FIX IT MODEL

Unfortunately many athletes and coaches have a negative stereotype about sport psychology. Traditionally sport psychology has been viewed as a "fix it" model. The athlete or coach comes seeking guidance only when there is a problem. Many see it as a last ditch effort to "fix" the athlete so the athlete can perform better. This is problematic because it creates a culture that views the use of sport psychology as a sign of "weakness" or "underperforming." The best athletes in the world in all sports have realized the importance of mental training in pursuing excellence in their sport. This highlights that everyone can benefit from mental training regardless of ability. When this becomes the mindset of the coaches and athletes then we can shift away from the "fix it" model towards a "build it" model.

MENTAL STRENGTH COACH

Mental strength coaches or certified mental performance consultants can provide expertise in mental training much like a certified strength and conditioning coach does in physical training. The mental strength coach is part of the support staff that serves the coaches and athletes in their efforts to pursue excellence in their sport. For this article, I will refer to the certified mental performance consultant as a mental strength coach. I refer to myself as a mental strength coach because this helps to more clearly define what I do and what I don't do, and it helps coaches and athletes make the connection between mental training and physical (strength) training in the weight room. As coaches, we do not send only our physically weak athletes to the weight room on a weekly basis. No, we send all our athletes including the national champions, and in many cases the national champions are the ones who buy into the strength and conditioning programs the most and see the greatest benefits. Mental training is the same way; every athlete should be doing it and the ones who are competing for the championship need it the most, as they are the ones who will be in the "high pressure," "make or break" or "championship" situations when they need their mind to be strong.

TO AND THROUGH THE COACH

As my mentor, long time track and field coach, sport psychology professor and certified mental performance consultant Dr. Rick McGuire says, "Sport psychology should be delivered to and through the coach." What this means is that the mental strength coach is not a replacement for the coach, the mental strength coach supports the coach. When working with a mental strength coach, the services provided should align with your mission and vision as a coach and should address the individual needs of your program and the athletes within it. Often, mental strength coaches are viewed as someone who can come in and give a motivational speech or do some goal setting or teambuilding. While they are trained in those areas this is not what is most effective and recommended. The ideal scenario is one where the mental strength coach can be integrated into the team in the same way the strength and conditioning coach and athletic trainer are part of the team. While it may not be possible to have a mental strength coach on hand full-time or even part time, as the coach you can still utilize this person as much as possible even if that means you're the only one communicating with the mental strength coach. Many successful coaches in a variety of sports use mental strength coaches in this capacity where the coach consults with the mental strength coach for advice and then goes back and implements it.

INTEGRATING MENTAL TRAINING INTO A PROGRAM

Mental training is best delivered when it is fully integrated into all aspects of the program. In order for mental training to be most effective, it needs to become part of the culture of the program. Mental training should not just happen behind closed doors in an office one on one. Athletes are always thinking. All day long, in and out of practice the athlete is thinking. So the athlete is always working on mental training, it is just a matter of the intentionality and quality of that training. Mental

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training should be built into the coaching philosophy and be present in all aspects of training. I work closely with our strength and conditioning coach and athletic trainers to help integrate mental training in those aspects of the program. This way, everywhere the athlete goes they hear a similar message and get more repetition in developing the desired mindset.

Strength and conditioning is a great opportunity to work on mental training as the athletes are in a controlled environment and have multiple repetitions of a variety of exercises that challenge them in different capacities. For example, working on composure via breathing techniques prior to, during and after exercises is a great way to learn to control activation levels, which impact focus and helps the athlete learn the connection that exists between psychology and physiology. For more detail on how to implement mental training into strength and conditioning, see this article www.nsca.com/Education/Articles/Hot-Topic-Integrating-Mental-Skills/

Athletic training is another avenue to integrate mental training into the program. Many coaches and athletic trainers often miss out on this opportunity as the focus is solely on the physical injury. Anyone who has ever been injured knows that there is a mental component as well. We need to get better as coaches in understanding this and working to treat the "mental injury" as well as the physical. This becomes especially important in the return to play process. For many athletes coming off of injury they may be physically ready but often are not mentally ready to return to play. Many times this is due to the lack of mental training done in the rehab process and only gets highlighted when they are forced with competing again and are lacking trust and confidence in their body. Much like the weight room, the training room is a con-

KIRBY LEE IMAGE OF SPORT PHOTO

trolled environment with repetitive exercise in the rehab protocols. Again this presents a great opportunity to incorporate mental training. Teaching the athletes to approach their rehab with the same mindset and effort they bring to their event training is very important. Too often athletes lose motivation and disengage from the team processes when they become injured. The importance of social support during the rehab process from coaches, teammates, athletic trainers, strength and conditioning coaches, etc. cannot be overstated. Depending on the severity of the injury the athlete may not be able to participate in normal practice and competition. In this case visualization in the form of watching film from training or competition both of the athlete and of other athletes can be very beneficial to keep the athlete engaged and improving their skills without actually performing the skill. A tip to improve visualization when watching film is to try to find clips of the athlete performing

KIRBY LEE IMAGE OF SPORT PHOTO

the skill/technique in the desired way. When watching film of other athletes, make sure to include footage from a variety of athletes so the commonalities in technique, etc. can be highlighted. Watching film of only one athlete who is maybe the Olympic champion in that event for example, has the potential to create problems because that Olympic champion may have a drastically different body type and have different experiences that influence the technique utilized and the current athlete cannot replicate it.

FINDING A MENTAL STRENGTH COACH

Mental strength coaches can come from a variety of backgrounds (sport science, counseling psychology, psychology, and other random fields of expertise). Most sport psychology professionals in the United States are employed as professors at universities. In these roles, they focus on research and teaching and often have a personal consulting business. Depending on the size and emphasis of the university and the academic program they work in, the professors will focus more on research and less on teaching or vice versa. As a full-time professor, at a small teaching institution, I fall into this category of a heavy emphasis on teaching and a smaller emphasis on research with a personal business in sport performance training. An example of what this looks like can be found on my website (http://drzuleger.com/). More and more universities are moving towards hiring full-time sport psychology professionals in the athletic department. This is a good thing and is something that as coaches you should be advocating for with your athletic directors. Many of these people are being hired as sport psychologist (licensed psychologists) and spend the bulk of their time working in mental health cases with the athletes. This is extremely important as there is a large need for these services in collegiate athletics and at all levels of sport. Unfortunately they often have little time to address the applied sport psychology or mental training side. There is a need for multiple individuals with a variety of skills working in applied sport psychology within athletic departments, just like there are multiple strength and conditioning coaches and athletic trainers, etc. Another example is the mental strength coach who operates solely as a private business. This person is often harder to find because they are not connected to a university directory. Searching the Internet these days for such a professional will yield a myriad of results, unfortunately it is often very difficult to discern the quality of the professional or ability to fit your needs. Almost all of them will have claimed to have worked with Olympic and professional athletes, whether that is the case or not is often difficult to find out. One way to sort through this is to utilize the Association for Applied Sport Psychology's website (http://www.appliedsportpsych.org/certification/find-a-consultant/). They provide links to the 500+ certified mental performance consultants in the world as well as more information regarding their certification. While I recommend coaches seek out a certified mental performance consultant, unfortunately, as with any certification the individuals that hold them can vary greatly in ability to deliver the services you may desire as the coach. I have colleagues and know of many professionals in sport psychology who do not hold this certification and they are very good at applying sport psychology in working with coaches and athletes. Ultimately, as the coach you need to find the person regardless of background whom you feel comfortable with and your athletes can connect with to see the most benefits from mental training.

MENTAL HEALTH RESOURCES

Mental health is one of the top priorities of the NCAA currently. While sport psychology professionals can also be mental health providers, this is not always the case. In my

role, I am not trained to be a mental health provider, but I have a baseline of training that helps me to refer coaches and athletes to a qualified mental health provider when needed. Depending on the qualifications of the mental strength coach there may be the need to develop a referral system. At Adams State University, I utilize our campus counseling services as the first resource. I have developed a model for sport psychology service delivery that includes them as a resource for coaches and athletes. If there is a need that our campus mental health professionals cannot meet than I refer to outside sources. An example of this may be an athlete who has a severe eating disorder. In the event that this becomes an issue, there is a high-quality resource in Denver that is an eating disorder clinic specifically for athletes. There is also one in St. Louis, MO and other non-sport specific eating disorder clinics around the country. A good free resource for coaches on mental health is available from the NCAA at (http://www.ncaa.org/health-and-safety/sport-science-institute/mental-health-best-practices-now-available).

APPLYING SPORT PSYCHOLOGY AS THE COACH

A coach does not need to be an expert or have a Ph.D. in sport psychology to be able to apply sport psychology into their coaching. Many coaches already implement forms of mental training, many times without even realizing it. For example the scenario mentioned earlier of using film to breakdown technique or strategy is a common practice in sport. Most coaches and athletes use film from a purely strategy or technique emphasis and miss the opportunity to use it as a method of visualization. The coach is in the best position to apply sport psychology as the coach is environmental engineer for the culture of the program. The more the coach can apply sport psychology concepts into the coaching philosophy and the day to day environment of the athletes the more comfortable the athletes will become with the language, concepts and skills or mental training.

EDUCATION IN APPLIED SPORT PSYCHOLOGY

A common trait among successful coaches is that they are always learning, always looking for ways to improve (Bloom & Salmela 2000; Zuleger, 2011; Zuleger & Vernacchia, 2012). There are several ways a coach can gain knowledge in sport psychology through formal and informal methods of coaching education.

Formal education. Obtaining continuing education in the physical and technical aspects of our sport is often much easier than finding any education (much less quality education) regarding the mental aspects of training and competing. Most coaching clinics ignore this aspect or loosely touch on it, but rarely in a way that a coach can take away knowledge and apply it. One good option for obtaining formal education on sport psychology is through the USTFCCCA Academy course in sport psychology. For more information about academy offerings see this link (http://www.ustfccca.org/track-and-field-academy). Another good avenue to obtain further education in sport psychology is through university course work. Coaches can take individual courses or pursue a complete degree in applied sport psychology. I created two master's degree programs in Applied Sport Psychology (on campus and online) to accommodate educating sport psychology practitioners and coaches. For more information about degree programs and courses in applied sport psychology at Adams State University see this link (http://adams.edu/academics/hppe/graduate/index.php).

Informal education. As stated above, highly successful coaches are always seeking out ways to improve at their craft. One of the ways to do that is through self-study via reading books, research, articles, listening to speakers, podcasts, etc. Another method is through conversations with fellow coaches and experts in sport science and other fields. There are endless books both in and out of sport psychology that are beneficial to read. The best resources I have encountered for sport psychology are "The Psychology of High Performance Track and Field" edited by Ralph Vernacchia and Traci Statler, and "Coaching Mental Excellence" by Vernachia, McGuire, and Cook, and "Inner Strength" by Ralph Vernacchia. While these are great resources, they may be difficult to find online to purchase, but if you can find them, that is where I would start reading. Some others that are easily accessible are "Relax and Win" by Bud Winter and Jimson Lee, "In Pursuit of Excellence" by Terry Orlick, "Life is Yours to Win" by Augie Garrido, "Mastery" by George Leonard, "From the Whistle to the Snap" by Rick McGuire and "Heads Up Baseball 2.0" by Ken Ravizza and Tom Hanson. A great podcast resource is "Finding Mastery" and "Minutes on Mastery" by Michael Gervais. There are many others I would be happy to share via email.

In conclusion, sport psychology is an under-utilized and often misunderstood area of sport performance that can greatly help coaches and athletes perform better. I strongly encourage you to seek out more education in this area. There are many trained professionals in sport psychology and many times they may be closer than you realize. For those coaches in the collegiate ranks you may not have to look further than your own university/college. For those working at other levels, you may have a local university or private business professional close by. For coaches at the high school and youth level, the sooner you can start introducing your athletes to the benefits of mental training the better. Many times athletes are exposed to mental training later in their careers and every single one of them I have encountered says "I wish I knew this when I was younger." With formal and informal education resources and online degree programs there is always the option to gain more education from anywhere in the world as well as your local resources. The more coaches we can have educated in sport psychology the more mainstream mental training will become, which will only improve performance for the athletes we coach in sport and in life.

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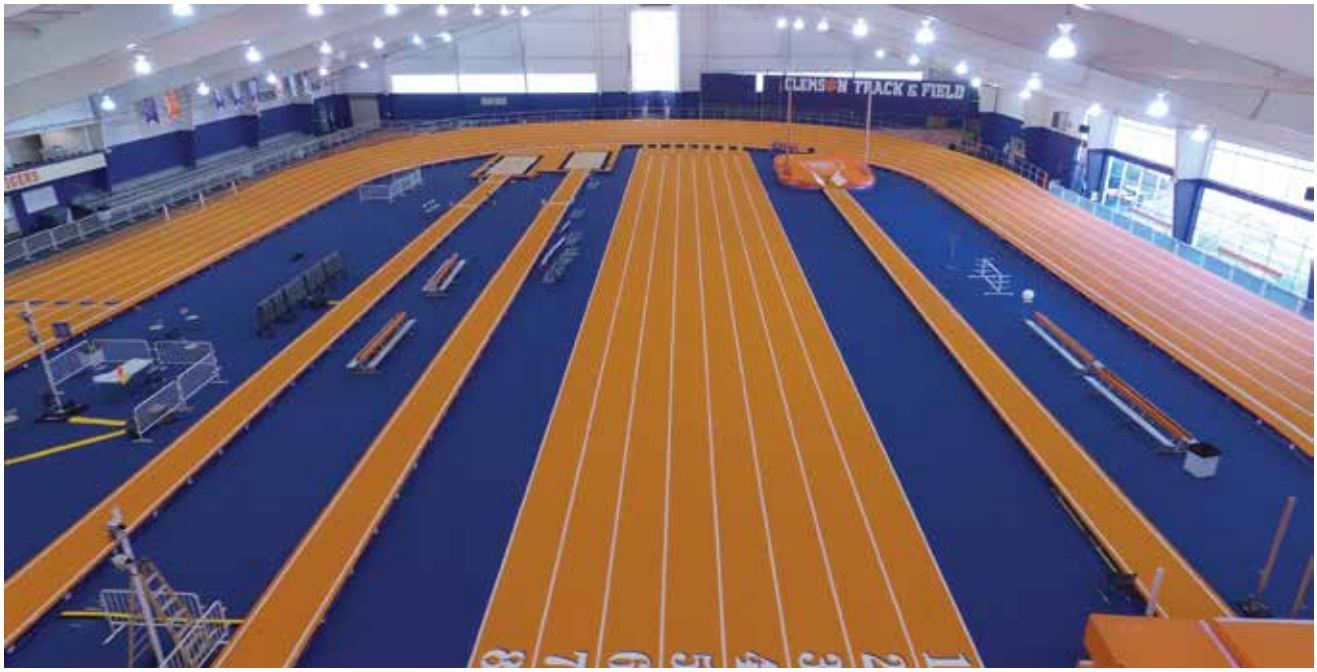

Track and Field Facility Maintenance

PUTTING IN THE TIME AND EFFORT CAN PAY DIVIDENDS IN GETTING WHAT YOU NEED

BY MARY HELEN SPRECHER

The seasons have changed, bringing athletes back outside. The question, of course, is always this: Is your track and field facility ready?

If, like many coaches, you've just emerged from the gym and are, for probably the first time in several months, taking a look around your facility. As a result, it may look – well, perhaps less than its best.

The good news, say the professionals who build track and field venues, is that you can help get things moving in a positive direction. It all starts with knowing the problem signs and staying in touch with your facility installer about them.

If the surface is forming mold and mildew (recognizable as a black film), pressure washing may help. It is essential to clean off this film, since it can not only coat track markings, making them difficult to see, but can create a slippery surface. However, prior to using any cleaning equipment, owners should always contact the installer first. In many cases, a specific technique needs to be used – or the installer may advise using a different piece of equipment entirely in order to avoid damaging the track surface. Be sure to ask before embarking on a cleaning program.

A key component of each coach's responsibility should be making regularly scheduled visits to the track – not to watch athletes but to examine the facility. Walk through the facility when it is deserted in order to avoid distraction. Look at the fences, the field, the curbing, the track surface and any outbuildings or shelters.

For best overall success in doing a walk-through, carry a notebook and your phone. If there are areas that appear to be problem spots, take pictures and send them to your installer. Most contractors would far rather investigate a problem before it becomes a serious issue in the middle of the season.

If the track is used by the community, the pros recommend the school keep an even closer eye on it. Many times, parents will bring children with them when they run or walk the track with their friends. Unfortunately, these parents often bring bicycles, trikes, strollers and more – none of which should be allowed on or near the track and field facility. (As a side note: Athletes who use wheelchairs generally use a different type of tire, more suited to the track surface, and these do not cause a problem.)

Other issues: community members who allow children to play in the sand pits, which means sand often gets tossed out onto the track, creating a potential hazard to athletes who are counting on having the proper amount of sand in the pit when landing after the long jump. Pets should also be kept off the track and field.

Ultimately, many things will contribute to the condition of a track: amount of wear, maintenance, climate, problems with sprinklers or water runoff – and more. Only by staying in contact with the professional can the owner be sure that all necessary precautions have been taken.

The American Sports Builders Association (ASBA) is the professional association for design professionals, contractors, suppliers of materials and equipment and more, for the sports facility construction industry. Available at no charge is a listing of all ASBA members, as well as publications produced by the Association.

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