Q^2

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SPECIAL REPORT

The Role Of Physical Preparation in Combat Disciplines

Core Strategies For Successful Training

Charles Staley's proprietary training strategies used with some of the Worlds top combat athletes!

by Charles Staley
Creator of the
Q^2 Training System

Q^2

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"Mastery of a martial art is accomplished by developing a foundation before progressing to more advanced levels of training"

One of the most challenging aspects of being a martial artist is the need to train for a wide array of motor qualities in addition to your technical skills sessions at the dojo. Most martial disciplines require high levels of speed strength, aerobic and anaerobic endurance, flexibility, coordination, agility, and quickness, to name just a few. Since there is only so much time (and energy) in a day, it can become quite a daunting task to prioritize and successfully integrate these various training elements.

Having helped numerous competitive fighters with these challenges, I am in a unique position to provide some clarity with respect to these issues. In this article, I'll provide you with several useful principles, which, when applied to your training program, will dramatically improve your efficiency and effectiveness, both in the dojo and also in the weight room.

The Principle of Foundation: The Training Factors Pyramid

Mastery of a martial art is accomplished by developing a foundation before progressing to more advanced levels of training. And while not all martial arts are considered sport, all martial artists can benefit from recent developments in sport science if they will only "empty their cup," so to speak.

With this in mind, the role of physical preparation can perhaps best be understood from within the context of the Training Factors Pyramid (TFP) a schema popularized by Dr. Tudor Bompa, a professor at York University in Toronto, Canada.

The TFP helps identify a logical sequence of training factors and can be used by athletes and coaches alike to identify objectives and evaluate training programs and methods. When problems develop, as they inevitably do, the TFP can be used to determine what level these problems originate from, which speeds up the corrective process considerably.

Q²

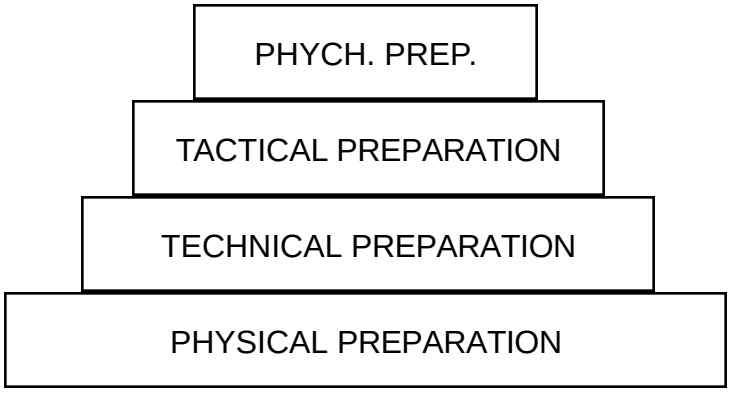
PRINCIPLES

THE ROLE OF PHYSICAL PREPARATION IN COMBAT DISCIPLINES

Figure 1 illustrates that the pyramid consists of four ascending levels. The athlete enters the pyramid at the first level, physical preparation. This level is the cornerstone of an athlete's training, because without it, further progress is impossible. Physical preparation refers to developing certain "motor qualities" such as strength, power, speed, balance, flexibility, agility, endurance, and coordination.

"Much like aviation accidents, injuries are usually multi-factorial."

FIGURE 1: The Training Factors Pyramid



The second level of the pyramid involves technical preparation, or perfecting physical techniques. While some techniques can be mastered with a low level of physical preparation, many cannot. For instance, a jump-spin crescent kick requires a high degree of dynamic balance, explosive strength, and flexibility.

Q^2

PRINCIPLES

THE ROLE OF PHYSICAL PREPARATION IN COMBAT DISCIPLINES

In the martial arts, where very difficult maneuvers are the norms, it is clear that physical preparation is a prerequisite for technical practice.

Of course, technical mastery is not the final objective for any martial artist. Many martial artists have "correct" techniques, but lack the ability to apply them in a sport or combat setting. The third level of the TFP addresses this deficiency by emphasizing tactical preparation. Tactics refer to the ability to successfully apply techniques in a sport (or combat) situation. Clearly, a technically sound technique must be established before entering level three. And of course, the athlete must have a high level of physical development before correct technique is possible.

"Physical preparation is a prerequisite for technical practice."

The fourth and final stage is psychological preparation, which is a very important consideration for martial artists who, by definition, are preparing for life-or-death situations. Naturally, psychological preparedness, or confidence, cannot be established if an athlete has not successfully ascended through the previous three levels.

The TFP can especially be useful in understanding training difficulties. Consider two athletes sparring when one athlete misses with a round kick and is scored upon by his opponent with a reverse punch. The question is, what happened? What's the problem? Employing the TFP can determine the root of the problem.

Q^2

PRINCIPLES

THE ROLE OF PHYSICAL PREPARATION IN COMBAT DISCIPLINES

To find the root, the first question asks if the athlete is capable of executing a technically sound round kick. If the answer is no, go down a level and try to find symptoms in physical preparation. Perhaps someone lacks proper flexibility or balance, or both. Once the physical attributes are improved, the athlete should be more successful in delivering the kick.

If the answer is yes (the athlete can throw a proper kick), the problem lies in either tactical or psychological development. Both areas are closely intertwined. A lack of tactical skill can obviously impair confidence and vice versa. Martial artists commonly progress well through physical and technical training, but falter in tactical and psychological realms. One remedy is more time in the trenches, with careful progression through gradually more difficult encounters. When tactical successes begin to outweigh the failures, confidence increases along with tactical ability.

"The techniques used in a particular sport determine the type of physical preparation that is needed."

Although we are addressing the four training factors in isolation for the sake of discussion, in reality they must be integrated if a successful outcome is desired. For example, is a feint a technique or a tactic? Obviously, it is both. At high levels of skill, techniques and tactics are often one and the same. Moreover, the direction of influence is not only ascending, but descending as well. For example, the techniques used in a particular sport discipline determine the type of physical preparation that is needed.

THE ROLE OF PHYSICAL PREPARATION IN COMBAT DISCIPLINES

In addition to short term considerations, the TFP also helps establish a template for long-term planning. Accordingly, the first several months of training should be dedicated to improving physical attributes, although basic technical and tactical skills may also be presented. The second phase of training is characterized by developing technical mastery. Good physical conditioning must be maintained, of course, but this involves less work than it took to develop it. Advanced stages of training address tactical and psychological concerns, with comparatively less time spent on physical and technical development.

General Versus Specific Training

"...whenever one's specific sport training can be used to develop essential motor qualities, that option is preferred."

All training components can be classified as either general or specific. Specific training involves all skills and tactics involved in your sport discipline. Everything else, including supplemental training for strength endurance flexibility, etc., is general training.

Generally speaking, whenever one's specific sport training can be used to develop essential motor qualities, that option is preferred. However, in most cases, practicing the sport by itself is insufficient for this purpose. Therefore, the purpose of general training is to develop motor qualities and abilities (such as strength, endurance, flexibility, etc) which will have a positive transfer to the sport discipline, which cannot be safely and effectively developed by practicing the sport itself.

THE ROLE OF PHYSICAL PREPARATION IN COMBAT DISCIPLINES

For example, hard sparring against very skilled opponents (the most specific form of training available to fighters) cannot be relied on as the sole method of aerobic conditioning, since most athletes would be unable to tolerate and/or recover from the large volumes of sparring that would become necessary to achieve this result. Supplementary activities such as running, cycling, swimming, and so forth, get the job done in a way that is safer and easier to recover from.

As aerobic fitness reaches a high level, the amount of such training can be significantly reduced (which will maintain the aerobic fitness level), allowing a shift to more intensive and specific training means later in the training cycle.

"As aerobic fitness reaches a high level, the amount of such training can be significantly reduced..."

Base Decision-making on Needs Assessment, Weak Links, and Current Physical Status

There are two primary considerations when it comes to planning the amount of time and energy that should be spend on developing the various physical qualities necessary for success in combat disciplines. One, to what degree is the quality needed for the sport in GENERAL, and two, to what degree is the quality in question needed for YOU.

For example, some athletes are naturally strong, while others are naturally fast, but not necessarily strong. In the former case, specific training devoted to speed improvement will be most effective, while in the latter case, strength training takes priority.

Q^2

PRINCIPLES

THE ROLE OF PHYSICAL PREPARATION IN COMBAT DISCIPLINES

As an athlete, it pays to be as efficient as possible—don't waste time and energy prioritizing skills or qualities that are already well-developed.

For every motor quality, there exists an "optimal" amount of development relative to a specific sport. Once you reach that point, further development of that quality is a waste of time and energy, and creates an increased risk for injury. By way of example, a heavyweight judoka might be well-served by the ability to squat 400 pounds. However, a wushu forms competitor should not seek such a high level of maximal strength, because 1) the needs of her sport do not require such high levels of strength, and 2) the training necessary to develop it would probably impair other traits and skills, such as the ability to perform intricate aerial acrobatics.

"...the majority of people who exercise...regard fatigue as the primary goal of training."

Stress Quality Over Quantity

Whether or not they realize it on a conscious level, the majority of people who exercise or engage in physical training of any type regard fatigue as the primary goal of training. This has always struck me as unproductive, yet some of the most popular trends in modern exercise culture support my premise. In fact, one of the most popular fitness trends today, Tae-Bo, is a great example.

Q^2

PRINCIPLES

THE ROLE OF PHYSICAL PREPARATION IN COMBAT DISCIPLINES

In Tae-Bo, the participant performs thousands of pseudo martial arts maneuvers to music within the course of a single class. After one year of regular Tae-Bo classes, the quantity of techniques you will have performed exceeds what a 10th degree black belt has experienced over 25 years of training. However, the quality of your martial arts skills will be somewhat less than a beginning martial arts student on his first day of class at the worst dojo in town.

Although the preceding example is almost comically obvious, many martial artists engage in excessively high training volumes either to satisfy a deeply-entrenched work ethic, or simply because "that's the way it's always been done." When volume (quantity) is too high, intensity (quality) is sacrificed in the process. Here's a practical example of what I'm talking about:

"When volume (quantity) is too high, intensity (quality) is sacrificed in the process."

You and your training partner decide to do a 500 kick training session. You face each other in fighting stances and alternate throwing kicks at each other, counting as you go. Your rationale is that the huge number of kicks will "toughen you up" and make kicking "second nature." This approach (correctly) assumes that each partner will benefit from experiencing a large number of kicks—for example, as one partner throws the kick, the other can practice defensive techniques, prevent flinching, etc.

Here is a better scenario:

Develop a way to quantify technique. For example, when executing roundhouse kicks, set up a "technique monitoring" system. When throwing a kick, it must be toward a target at least mid-torso in height; the kicking knee must be in line with the hip and ankle and, each partner must maintain their guard while kicking and neither should lean backwards while throwing the kick. If either of you violates any of these parameters, the kick doesn't count. Using this system, throw as many kicks as possible in the session until technique begins to degrade. Count how many kicks were thrown, and the next session attempt to exceed that number.

"...begin with training of a very general nature, and gradually shift to more sport or event-specific training...."

Progression of Specificity Over the Course of a Training Cycle

The training cycle typically should begin with training of a very general nature, and gradually shift to more sport or event-specific training as the competitive period looms near. In his excellent text *Science of Sports Training*, Tom Kurz describes four categories of exercises, according to their level of specificity to the competitive sport or event:

Q^2

PRINCIPLES

THE ROLE OF PHYSICAL PREPARATION IN COMBAT DISCIPLINES

1) General: Exercises designed to promote motor qualities, such as strength training, flexibility exercises, endurance drills, and so forth.

2) Directed: Exercises which develop motor qualities, but in a more specific manner. For a fighter, directed exercises might include rope skipping, hitting the speed bag, and throwing techniques in the air.

3) Special: Exercises designed primarily to improve technical and tactical skills. Hitting the heavy bag and sparring drills are examples.

4) Competitive: These are exercises which closely or exactly mirror the actual competitive event or task. Free sparring would be an example.

"...experienced athletes require less in the way of general and directed exercises, since they are already at a high level of preparedness."

From the perspective of one's sport career, experienced athletes require less in the way of general and directed exercises, since they are already at a high level of preparedness. Beginners, on the other hand, spend most (if not all) of their time performing general and directed drills. This concept is quite harmonious with the training factors pyramid discussed earlier.

Q²

PRINCIPLES

THE ROLE OF PHYSICAL PREPARATION IN COMBAT DISCIPLINES

Conclusion

Commonly, the more an athlete reads about training, the more confused he or she becomes. It is important to realize that there are many philosophies and methods— if there was indeed a single correct approach, it would have been discovered long ago, and there would be no need for further discussion.

TABLE ONE: Classification of Strength Qualities

Of all the aspects of physical preparation, strength is often prioritized because 1) it is among the easiest of qualities to develop, and 2) it forms a foundation for many other important qualities. This table illustrates the various forms of strength available to athletes.

"Maximal strength forms a foundation for other motor abilities..."

Maximal Strength: The amount of force that can be generated for one all-out effort, regardless of time or bodyweight. Martial artists don't display maximal strength in competition, however, maximal strength forms a foundation for other motor abilities such as power, speed, strength endurance, and others. Maximal strength can be displayed through three types of muscular actions:

- Concentric Strength— the muscle shortens as it overcomes a resistance. In weight training, lifting a weight is an example of concentric activity.
- Eccentric Strength— the muscle lengthens as it yields to or attempts to overcome a resistance.
- Static Strength— the muscle contracts against an immovable resistance, or contracts to prevent unwanted movement.

THE ROLE OF PHYSICAL PREPARATION IN COMBAT DISCIPLINES

TABLE ONE (CONTINUED)

Relative Strength: one's maximal strength relative to bodyweight. Otherwise known as "pound for pound" strength.

Speed Strength (SS): Strength per unit of time. SS is defined as work divided by time, where work is defined as force x distance. Therefore, SS is defined as force x distance, divided by time. SS is characterized by three components:

"Speed strength is defined as work divided by time."

- Starting strength. The ability to recruit as many muscle fibers as possible instantaneously at the start of a movement. Common examples include a jab in kickboxing, coming off the line in football, and the start in short sprints.
- Explosive strength. Acceleration, or rate of force development. In other words, once a maximal number of fibers are recruited, how long can an athlete keep them recruited? Think of starting strength as the flash bulb of a camera, and explosive strength as a flash that stays on and becomes brighter and brighter the longer it stays on.
- Reactive strength: the storage of potential kinetic energy during the eccentric portion of a movement, which is then converted to actual kinetic energy during the subsequent concentric phase, much like stretching and releasing an elastic band.

Q²

PRINCIPLES

THE TEN MOST COMMON TRAINING MISTAKES MADE BY MARTIAL ARTISTS

Noted sports scientist Dr. Paul Ward uses the following formula to predict success in athletic competition:

Productivity = Potential — Losses Due to Faulty Process

While your potential was determined at birth, there's still much that can be done to minimize the mistakes you make along the way. After years of training and consulting to competitive martial artists, I've compiled a list of the ten most common errors (all of which I've made myself at one time or another) that martial artists make when embarking upon strength training programs:

"All human movement requires strength."

1) Not training for strength: Many martial artists feel that strength training is counter-productive, causing one to become too large and slow, despite the fact that in every other sport known to man, it makes athletes faster. Training like a bodybuilder (see mistake number 3) can certainly produce these undesirable effects, but properly designed strength training programs improve strength, speed, agility, endurance, and technical performance. Strength training should be viewed as a tool, the utility of which depends upon the context it's used in.

2) Training for the wrong kind of strength: Strength as a bio-motor ability has many expressions. All human movement requires strength, and for this reason, all athletes must concern themselves with developing their strength levels to the utmost. What many don't know, however, is that there more types of strength than there are bogus ab-training gadgets on late-night info-mercials! Here's a partial list:

THE TEN MOST COMMON TRAINING MISTAKES MADE BY MARTIAL ARTISTS

Maximal Strength: The amount of musculoskeletal force you can generate for one all-out effort. Maximal strength is your athletic "foundation," but it can only be expressed in the weight room during the performance of a maximal lift. While only powerlifters demonstrate this type of strength in competition, martial artists need to develop high levels of maximal strength in every muscle group.

Relative Strength: This term is used to denote an athlete's strength per unit of bodyweight. Thus if two athletes of different bodyweights can squat 275 pounds, they have equal maximal strength for that lift, but the lighter athlete has greater relative strength.

"Maximal strength is your athletic 'foundation.'"

Competitive events which have weight classes depend heavily on relative strength, as do sports where the athlete must overcome his or her bodyweight to accomplish a motor task (such as a jump kick). Further, events which have aesthetic requirements (kata competition, for example) rely heavily upon the development of strength without a commensurate gain in bodyweight.

Strength can be developed through two very different means— by applying stress to the muscle cells themselves, or by targeting the nervous system. The former method is accomplished through the use of bodybuilding methods (repetitions between 6 and 12), and results in strength gains through an increase in muscle cross-section. The latter is accomplished through higher intensity loads (repetitions between 1 and 4), and increases in strength are the result of the body's improved ability to recruit more of its existing motor unit pool.

THE TEN MOST COMMON TRAINING MISTAKES MADE BY MARTIAL ARTISTS

For martial artists and other athletes who depend upon relative strength, bodybuilding methods should be used sparingly, unless a higher weight class is desired. Most strength training sessions should consist of high intensity, low repetition sets, which improve strength through neural adaptations rather than increases in muscle cross section.

3) Training like a bodybuilder: My consultations with competitive martial artists reveal that bodybuilding is the predominant paradigm in today's strength training world, at least in this country. But bodybuilding methods are designed to produce muscle mass, not strength. And while bodybuilders are strong, their relative strength is poor compared to other explosive strength athletes. These methods have some degree of utility for beginning martial artists as a means of attaining basic fitness, but after a year or so, they should be used sparingly, if at all.

"...as soon as you go beyond approximately 12 repetitions, the stimulus is too weak to favorably improve strength values."

4) Using insufficient intensity: Most martial artists can relate to doing hundreds of pushups, sit-ups, and leg lifts in class, but as soon as you go beyond approximately 12 repetitions, the stimulus is too weak to favorably improve strength values. Think about it: as a martial artist, would you rather have the ability to perform weak techniques for hours on end, or the ability to deliver explosive, powerful techniques when it really counts? In training, you reap what you sow.

Q²

PRINCIPLES

THE TEN MOST COMMON TRAINING MISTAKES MADE BY MARTIAL ARTISTS

5) Lack of variation: While many people realize that the training load must be progressively increased, few understand that the training stimulus must also be periodically be varied in order to prevent stagnation. Elite sprint coach Charlie Francis recommends changing the training program whenever there is a one week plateau in strength gains. Internationally acclaimed strength coach Charles Poliquin utilizes alternating phases of high volume with phases of high intensity in order to keep his athletes progressing.

6) Lack of periodization: Periodization refers to planning the training process. For most, the idea of planning is intuitively obvious with regards to business, family, and finances, but when it comes to training, most people don't make the connection. While many people attribute the success of Eastern-bloc athletes to illegal steroid use, periodization deserves the real credit. The martial arts seem to be the last sport on earth to take advantage of this important tool!

"The most important stabilizers are those of the trunk."

7) Excessive use of machines: "Machines" according to exercise specialist Paul Chek, "are like sleeping pills for the muscles." Chek is referring to the fact that machines tend to rob the stabilizer muscles of adaptive stress. Stabilizers are muscles which anchor or immobilize one part of the body, allowing another part (usually the limbs) to exert force. The most important stabilizers are those of the trunk— the abdominals and trunk extensors. If the motor cortex detects that it can't stabilize the force provided by the prime movers, it simply won't allow the prime mover to contract with full force.

Q^2

PRINCIPLES

THE TEN MOST COMMON TRAINING MISTAKES MADE BY MARTIAL ARTISTS

8) Ignoring the principle of specificity: The body's adaptation to training is very specific to the type of training that has been endured. This is sometimes referred to as the "S.A.I.D." principle— Specific Adaptation to Imposed Demand. So, as an obvious example, if you want to develop strength in your legs, you have to do strength training exercises for the legs.

Less obvious than the previous example is the fact that exercises must be done at specific volume and intensity ranges in order to elicit the desired result. For example, if you're trying to grow muscle, you must perform exercises in sets of five to ten repetitions— roughly corresponding to 70 to 85% of your maximum capability for a single repetition. It's not enough to simply make sure you're training the right muscles!

"...instructors make the mistake of thinking that if an exercise 'mimics' a desired skill, it is specific."

Commonly, instructors make the mistake of thinking that if an exercise "mimics" the desired skill, it is specific. A common practice involves trying to improve punching speed by rapidly "punching" with light dumbbells as fast as possible. But this method is flawed, because the angle of resistance is incorrect, assuming that this exercise is done while standing erect. A better approach would to be to perform dumbbell bench presses, which correctly align the muscle fibers against the resistance being used.

THE TEN MOST COMMON TRAINING MISTAKES MADE BY MARTIAL ARTISTS

The specificity principle is abused in other aspects of martial arts training, as well. Most instructors train their students aerobically, despite the fact that nearly all forms of martial art, including self-defense scenarios, are predominately anaerobic. Another common example is the practice of slowly extending a kick, and then holding the leg in mid-air until the instructor gives the signal to return it to the floor. While this method may work if you intend to find employment as a human maniquin, for the purpose of improving kicking power, it borders on useless.

"...too much time in the weight room grinding out heavy weights at slow speeds...results in slow athletes."

9) Ignoring rate of force development: Being strong won't help you if you don't have enough time to display it! In the martial arts (as in most athletic endeavors), the problem is that the amount of time to develop maximum muscular force is extremely limited— usually only a fraction of a second. While high levels of maximal strength are a necessary prerequisite for the development of speed strength (power), too much time in the weight room grinding out heavy weights at slow speeds, without switching to speed strength methods later in the training cycle, results in slow athletes.

The ability to apply muscular force rapidly is called rate of force development, or RFD. While bodybuilding methods slightly improve maximal strength, it has a negligible effect on RFD. Training with heavy weights significantly improves maximal strength, but again, the RFD remains largely unchanged. Only when speed strength methods (plyometrics, ballistic training, etc.) are used, is the RFD significantly improved.

THE TEN MOST COMMON TRAINING MISTAKES MADE BY MARTIAL ARTISTS

Unfortunately, many athletes unknowingly reinforce this imbalance every time they train, thinking they are respecting the principle of specificity by training only the prime movers (or "agonists"). An example would be a martial artist who reasons that since the quadriceps muscle extends the leg during kicking, the quadriceps should receive the brunt of the training focus. Before long, the hamstrings (which are the antagonists in kicking movements) are weak in proportion to the quads, and power output declines. At this point, the martial artist may conclude that weight training "slows you down," because for him, it did.

"...the martial artist may conclude that weight training 'slows you down,' because for him, it did."

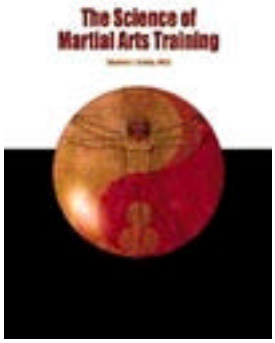
Here's the problem in the above example: the weaker the antagonists are, the sooner they will contract and oppose the prime movers (to prevent joint hyperextension), resulting in a slower movement. But stronger antagonists are less sensitive to this protective response— the body "knows" that they are strong enough to decelerate the limb at the last possible moment. The next time you watch elite boxers on TV, notice the development of the lats and biceps. Great punchers always have well developed antagonists.

10) Mistaking strength training as the ends rather than the means: While it might seem ironic, the objective of strength training is NOT increased strength per se, but improved athletic performance. I would suggest that sports conditioning coaches keep this in mind as they design conditioning programs for their athletes.

Q^2

PRINCIPLES

THE SCIENCE OF MARTIAL ARTS TRAINING BY CHARLES STALEY



The Science of Martial Arts Training is Charles Staley's bleeding-edge, comprehensive training manual for martial artists and combat athletes. Charles relied heavily on his experience training several World-ranked competitive fighters as he formulated this book.

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—Tim Larkin Former Master Trainer SCARS Institute Of Combat Sciences

Q^2

PRINCIPLES

ABOUT THE AUTHOR

Charles Staley is a sports performance specialist and director of Integrated Sport Solutions in Las Vegas, Nevada. A former martial arts competitor and trainer, Staley is also an Olympic weightlifting coach, as well as a master's level track and field competitor (discus event). He has coached elite athletes from many sports, including martial arts, luge, boxing, track & field, bobsled, football, Olympic weightlifting, and bodybuilding. Staley has written hundreds of published articles, and has lectured extensively on the topics of human performance and sport training. Subscribe to Charles' FREE monthly newsletter The Unnatural Athlete at http://www.myodynamics.com.