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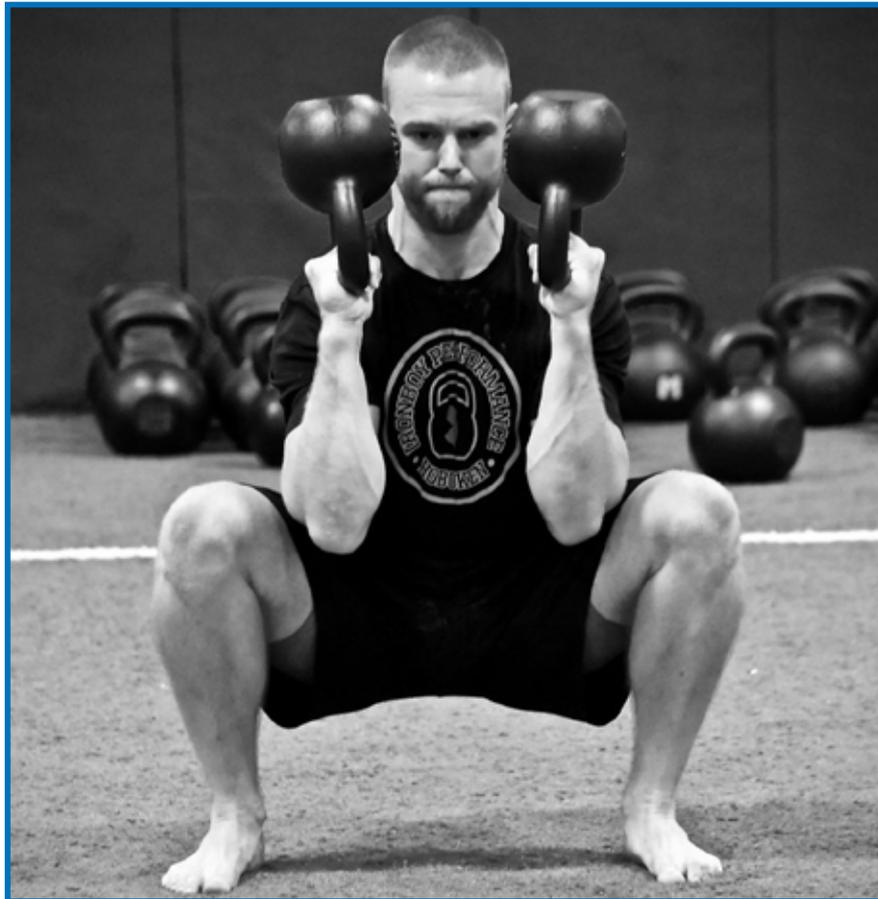
HARDSTYLE KETTLEBELL TRAINING

WHAT GOES AROUND, COMES AROUND

By Vik Khanna and Zar Horton

Photos Courtesy of StrongFirst, Al Ciampa and Justyna K. Mackova

Movement begins with intention. Breath drives action, and breath and body finish together. Arm and hand flash to the target with all the energy generated by the hips, legs, and torso. At movement peak, there is full kime, with complete engagement of the posterior chain and the trunk, which is the conduit for energy transfer to the arm and hand. Impact lasts a split second, after which there is relaxation before preparation for the next technique. Sounds like a soundly delivered gyaku-zuki, right?



It is actually also the formula for a hardstyle, ballistic kettlebell swing. Hardstyle kettlebell training, a Russian creation (so, too, is the kettlebell), is grounded in the breath-driven, tension-relaxation rhythm of Okinawan karate. As such, hardstyle kettlebell work is the perfect strength and conditioning match for any enterprising karateka, young or old, or for any person seeking a higher level of strength, power, and mobility.

The current popularity of kettlebell training springs from the diligence of Pavel Tsatsouline, head of StrongFirst. Pavel, who is expert in martial arts, hand-to-hand combat, and kettlebell application to both, has the unique experience of having advised both Russian Special Forces and the U.S. Marine Corps and Secret Service on the use of kettlebells for maximal fitness with minimal equipment, but with high concentration on complex training concepts that produce the four essential elements of athletic excellence: strength, aerobic capacity, mobility, and explosive power.

The Big Six kettlebell moves divide neatly into two categories: ballistics and grinds. Ballistics -- the swing and its two complex cousins, the clean and snatch -- are the power moves that build explosive hip extension (vital to nearly every karate action) and the achievement of full kime at the end of each movement through engagement of the posterior chain (the calves, hamstrings, glutes, and spinal erectors) as well the mus-



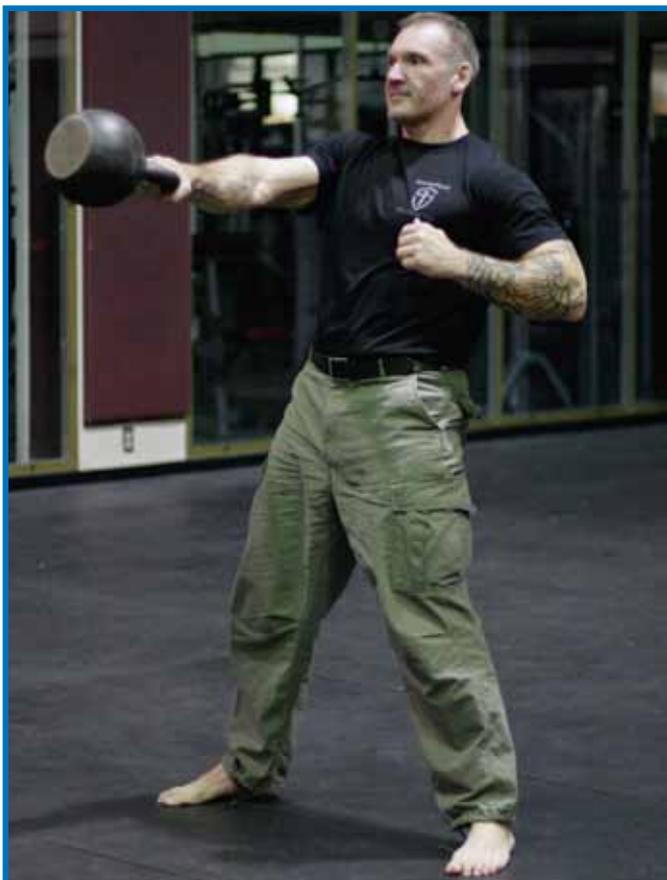
cles of the trunk (in particular, the obliques and both rectus and transverse abdominal muscles) before a rapid relaxation, preparation, and transition into the next explosion.

The grinds are a different flavor altogether. The Turkish Get Up (TGU), overhead press, and both front and goblet squats teach the athlete how to engage his or her whole body in the generation and radiation of strength, relying once again on the breath to initiate and full kime at the conclusion before commencing a relaxation phase. The two types of squat offer terrific potential benefits for trunk strength, hip mobility, and leg power.

Interestingly, with the exception of kettlebell squats, the other five moves incorporate both open chain and closed chain training, allowing the athlete to remain rooted to the ground (the closed chain element) while simultaneously delivering energy through the trunk to the distal hand and arm that are holding the kettlebell away from the midline of the body (the open chain element). This is exactly what happens in a punch or kick.

In combination, kettlebell ballistics and grinds are unparalleled in their ability to improve force production, power output, complex neuromuscular drive and coordination, and mobility, without the anachronisms of muscle-group-by-muscle-group conventional lifting, running, and long-hold, static stretching, which is not only overrated, but has never been proven to produce lasting improvements in athletic mobility (1).

In his article Strength and Conditioning Training: Unlocking A Risky Business, in the Spring 2017 issue of this magazine, Jake Botto nicely opened the door to a robust discussion about the benefits of strength training for traditional karateka. The critical question, however, is whether the American karate community is ready to embrace modern training principles and adapt them to highly competitive needs of contemporary sport.





Because the karate competition in the Tokyo Olympics will have only 80 athletes from around the world, the scramble for another American, in addition to Texan Tom Scott, to crack the WKF rankings, earn a spot, and compete for medals will be intense. This makes the 2020 games a singular opportunity to raise the profile of karate in the U.S., where it is a niche sport that is broadly misunderstood and underappreciated (no, ma'am, we are not MMA, and we do not teach body slams, armbars, and choke holds). American media and sports fans love winners. If American karateka stand on the podium while the National Anthem plays, the trajectory of karate in the U.S. sports and fitness marketplace is almost certain to change.

For many dojos, it is impractical and cost-prohibitive to implement Olympic-style weightlifting programs that build power and coordination in the posterior chain. The space, equipment, and coaching expertise required present daunting obstacles. The power of kettlebell training, however, is available to every dojo that is willing to invest modestly in equipment but be extravagant in letting go of the myths that strength impedes power and explosiveness and that long-hold static stretching builds mobility (2).

The Urban Myth That Strength Impedes Power

Traditionalists in many sports have historically eschewed strength training for their athletes on the misguided and non-evidence-based belief that strength impedes power production and speed. This is demonstrably wrong; no one looks at modern athletes and proclaims them to be “bigger and slower” than their predecessors. They are virtually all bigger and faster, and everyone from sports announcers to sport scientists knows this to be true.

Norton and Olds proved in 2001 not only that today's athletes are significantly larger, but that size facilitates success. Today's bigger athletes play better, have longer careers, and more financial success than their smaller ancestors. The largest changes in body mass (a unitary way of expressing height and weight) are all in the power sports: track and field throwing (shot put, hammer, discus, javelin), the National Football League (NFL), the National Basketball Association (NBA), rugby, and boxing.

Before Tiger Woods, the golf establishment openly ridiculed strength training for its genteel pursuit. Tiger Woods was the best golfer of his era and arguably the best athlete the sport has ever seen, with a robust strength training strategy and unrivaled rotational power. Michael Phelps, the greatest swimmer of all time, lifts and pushes a power sled in training. Kayla Harrison, American Gold medalist in judo in 2016, is renowned for her commitment to her strength training regime. At the 2016 Games, Russian athletes, whose devotion to hardstyle kettlebell training and Olympic lifting is rich and enduring, dominated the combat sports of wrestling and boxing.

Brazilian Shotokan legend and MMA star Lyoto Machida is an avid and accomplished Olympic weightlifter (see <https://www.youtube.com/watch?v=CkTvXWgMaaM> and <https://www.youtube.com/watch?v=ldI2Gzoadh8>). Loturco, et al, showed in 2014 that on the Brazilian national karate team, the strongest punches and kicks come from the athletes who also demonstrated the greatest strength (4) in testing.

The best demonstration of the difference strength and mass make to speed and quickness comes from the NFL. Few sports so diligently record the performance parameters of their athletes, starting with the ostentatious NFL combine. Looking at data for three NFL greats (Gale Sayers predates the combine) allows only one inescapable conclusion: today's athletes are bigger and faster, demolishing the myth that size and strength impede explosive power.

NFL Athlete (year)	Ht	Wt	BMI	40 yd dash time (sec)	Bench press (lbs)	Vertical leap (inches)
Gale Sayers (1965)	6' 1"	198	26.1	4.7	200 (estimated)	Not recorded
Barry Sanders (1988)	5' 8"	200	30 (15% bigger than Sayers)	4.37 (7% faster than Sayers)	350 (75% more than Sayers)	44 (19% more than Jackson)
Stephen Jackson (2004)	6' 2"	231	29.7 (14% bigger than Sayers)	4.35 (7.4% faster than Sayers)	335 (67% more than Sayers)	37

No thinking person who's ever seen film of Barry Sanders would regard him as slow afoot. He was, almost literally, a bodybuilder with the agility and shiftiness of a ballerina.

Even more interesting are the data comparing Jesse Owens, the iconic American sprinter, to Usain Bolt, the greatest sprinter ever. Bolt, who routinely hit the weights throughout his historic run of Olympic Gold medals, is a bona fide strength training devotee, and no one will ever say his time in the gym slowed him down.

Sprinter (year)	Ht	Wt	BMI	100 m dash time (sec)
Jesse Owens (1936)	5' 10"	165	23.7	10.3
Usain Bolt (2016)	6' 4"	207	25.2 (6.3% bigger than Owens)	9.6 (4.8% faster than Owens)

The Strength-Power-Speed Continuum

Understanding how hardstyle kettlebell training can develop powerful and durable karateka requires clarity about what the elements of strength, power, and speed really are. Strength and speed lie at the two ends of a continuum. Strength is maximal force exertion (recruitment of the motor neurons and biggest, strongest muscle fibers), while speed is maximal rate of movement (recruiting those muscle fibers quickly and making them fire rapidly). Hence, strength is primarily a neuromuscular phenomenon and only after neuromuscular function is optimized does the contribution of increasing muscle mass come into play. Typically, if you are trying to lift the heaviest object you can, you will move relatively slowly; conversely, if you aim to move as fast as possible, you will not be able to overcome much resistance.

Power is the happy medium, the point at which the athlete finds a sweet spot between the two extremes. Karate -- like most sports -- is a power sport. No matter whether the need is kata, kihon, kumite, or, actual self defense, it is not enough to move fast without force or or move forcefully without some speed. The athlete must be both fast and strong...powerful.

The Karate-Kettlebell Match

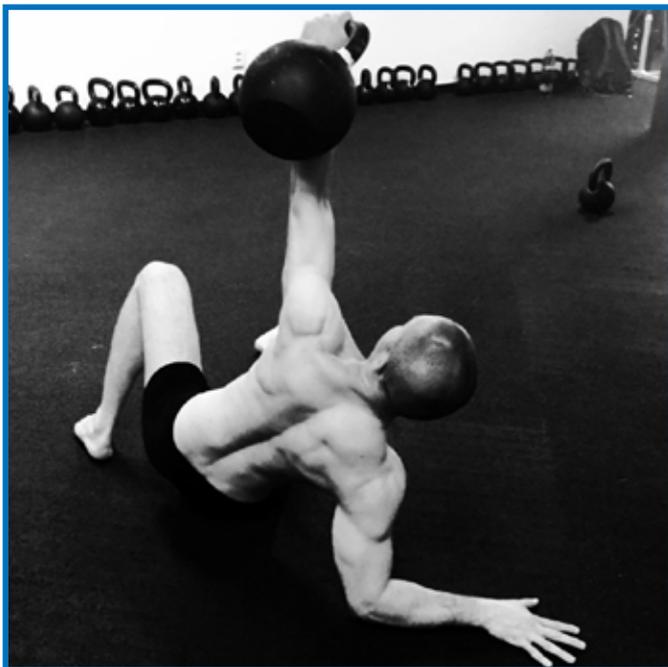
Hardstyle kettlebell training is almost endlessly adaptable to the needs of individual athletes. By manipulating the movement mix, number of sets and reps, weight, and rest vs. work periods, dojo leaders can craft training programs that allow for a year-round training program that is safe, sustainable, and directly applicable to the needs of the sport and the individual athlete. Because competitive karate involves both anaerobic and aerobic energy systems (5, 6) and mobility, hardstyle kettlebell training's functional value is unrivaled; you can build all three with a commitment to just one tool and sophisticated grasp of program development even if you never venture beyond the Big Six moves.

Because hardstyle kettlebell training is submaximal (i.e., the purpose is not to seek out or test maximal strength), it can, with some tinkering, provide athletes with training options that they can use throughout their karate year, and it allows for targeting of specific movement needs. The submaximal element reduces the risk of injury, helps to prevent training burn-out, and encourages attention to movement-specific technical refinement, as opposed to the ego satisfaction of "hey, I lift more than you do."



Hardstyle kettlebell training also allows the athlete to train in a manner that provides a functional mechanical and breathing match to the needs of the sport. In the kettlebell swing, for example, the athlete's body arrives at a vertical plank posture at the same time that his powerful exhalation finishes, and there is a lightning bolt of full kime through the posterior chain and trunk. The kettlebell, held at arm's length, having absorbed the energy of the hips slamming forward, arcs upward while the arms and hands are partially engaged. As the bell floats back down, the karateka relaxes, breathes, and then pulls himself into a full hip hinge for the next technique. This mimics the body dynamics necessary for full todome waza strikes and return to zanshin.

The other element at play is the eccentric loading (negative work) that the kettlebell facilitates. In the ballistics, the kettlebell returns to the athlete's midline at velocity and is then pushed through the opening between the legs with a force that is significantly greater than the nominal weight of the bell. The body absorbs this force and then must overcome it to propel the bell back out. Put another way, a 53 pound kettlebell being swung by an experienced athlete can move up and down with greater than 250 pounds of force; analysis of kettlebell masters such as Pavel himself, show that force generation can reach 500 pounds. Done properly, the plank-hinge-release-return-to-plank sequence lasts between 0.75 and 1 second.



The speed of movement in hardstyle kettlebell ballistics make dramatic use of the stretch-shortening cycle of the muscles. The brief, almost violent stretch imparted to the muscle fibers of the hips and hamstrings when backing into the hinge facilitates powerful contraction that is not possible moving slowly. The stretch-shortening cycle is the “rubber-band” element of muscle contractility that is achievable only through this kind of plyometric-style engagement. Notably, if an athlete pauses and holds the hinged position (or any posture from which explosive power is the desired result), most of the potential energy is lost as heat. Moving quickly from neutral to stretched to contracted is the key to all the ballistics.

This system is far closer to actual plyometric movement, as envisioned by its founder, Yuri Verkoshansky, than are commercially popular programs such as P90X. P90X is not plyometrics; it is, at best, stylized aerobics with jumping and as-many-reps-

as-possible (AMRAP) calisthenics training that encourages technical slop. AMRAP might improve athletic dynamics, particularly in untrained subjects, but so, too, would virtually any other formal training system. P90X and AMRAP calisthenics are not systems adaptable and scalable for the needs of progressively stronger and fitter athletes; they do not rely upon or require technical proficiency; they lack a mechanical and breathing match for karate, and there is zero evidence of their utility in highly demanding sports that require not just power but the complex coordination and baseline strength of a martial art.

In the grinds, the kettlebell's offset center of gravity provides for a unique way of building rotational stability and power. Because the center of gravity is outside the grip and away from the midline, that's the direction in which the kettlebell is pulling the athlete. The athlete must constantly correct for this force, countering it by engaging the muscles on the opposite side. Hence, the resistance to rotation strengthens the same muscle groups of the hips and trunk that must generate rotational force. The TGU is the single best whole-body strength movement that virtually any athlete can do. It not only teaches development and control of whole-body tension and relaxation, but also movement flow, controlled deep breathing, rotational control, and proprioception (knowing where the limbs are in space without seeing them). These skills are directly transportable to karate.

The Challenge

Hardstyle kettlebell training is hard, and it is complex. It is a technique driven training modality that require both physical and emotional maturity and diligent devotion to learning and skill development, not just slinging weights around. All of the Big Six moves requires whole body coordination and engagement, as well as zealous attention to timing, intention, breathing, and knowing when to contract and when to relax. Learning the ballistics and the grinds takes time and skillful, knowledgeable coaching, but most importantly, engaged students who believe that strength is a skill worth learning.

In nearly every sport you can think of, the top athletes strength train. It has taken four decades to reach that point; in 1977, there was virtually no scientific literature on the health or athletic benefits of strength training, and it was unheard of for teams to have strength coaches or the weightlifting resources they have now. Now, if you don't strength train, you are the odd person out and almost certain to not make the cut.

Hardstyle kettlebell training is coming into its own across the sports spectrum. Teams in the NFL and National Hockey League (the athlete's rotation on a slap shot is almost exactly the rotation of the first move of the TGU) and MMA fighters are taking up this form of training in increasing numbers.



To do so effectively, they all have to let go of preconceived notions about what works and what doesn't to integrate new data. Not everyone is up to this challenge.

Many dojos are small businesses led by karateka who are skillful and accomplished, but mostly trained in an aging paradigm that has outlived its utility. Further, successful athletes often don't make great coaches. Their perspectives on what works are frequently clouded by their deeply ingrained biases (in particular, confirmation bias and survival bias). They pursue validation of their experiences rather than new information, substituting egotism for evidence. This educational malpractice is the opposite of strategic thinking.

The potential payoff for devoted dojos is huge, however, if they are willing to reach out and introduce into their training regimes coaches with the right expertise. Building and showcasing more dynamic, athletic karateka on local, regional, national, and international stages is the most important way to expand karate's footprint in an ever more competitive sports marketplace. It is also key to helping dojos compete more effectively in their local markets, showing that productive martial arts training is about more than collecting belts; that, indeed, a martial arts dojo is a place where anyone can learn a well-rounded set of life-enhancing skills that will help them withstand the march of time. Considered in this way, it is clear that hewing to tradition at the expense of effectiveness and efficiency will be the same thing losing ground. **USANKF**

Vik Khanna is a StrongFirst SFG 1 Kettlebell Instructor, and First Kyu in Shotokan karate in Chesterfield, MO. In addition to academic training in exercise science, internal medicine, and public health, Vik has over 40 years direct, personal experience in strength training.

Zar Horton is a Master SFG with StrongFirst. He is a professional firefighter in Albuquerque, NM, where he is a member of the command staff. Zar is also a certified Ground Force Method movement instructor and has trained professional MMA fighters at Greg Jackson's Wink MMA Academy in Albuquerque, NM.

1 Reynolds, G. Reason not to stretch. The New York Times. April 3, 2013. https://well.blogs.nytimes.com/2013/04/03/reasons-not-to-stretch/?_r=0

2 Flexibility is the passive range of motion of a joint. Mobility is the useful range of motion of the joint; in other words, the range of motion through which the athlete can produce force. Mobility matters.

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