ITF Taekwon-Do and Sine Wave as "Sequential motion":
More power than what meets the eye

By Manuel E. Adrogué[1]

Part I

In this three-part series the author discusses technical reasons underlying the transformation of Shotokan / Korean Karate technique into Chang Hon (ITF style) Taekwon-Do, and shares his personal story on how an inquisitive attitude, the exposure to certain martial arts icons and diligent training gradually changed his perception of Taekwon-Do technique as it relates to striking power and speed.

In "Taekwon-Do's Science" (Totally Tae Kwon Do # 12) Stuart Anslow and Bob Hubbard share intelligent thoughts about the very obvious fact, sometimes hidden behind a cloud of advertising, that ITF Taekwon-Do does not hold a monopoly in physics. For good or bad, we are all equally governed by the forces described in Sir Isaac Newton's Three Laws of Motion, without distinction of the martial art we practice. Individuals we regard as technical examples are those able to show superior timing, distance, balance, speed, striking power, bodily control, ability to blend with the opponent, and other displays of physical prowess, regardless of the martial arts system they come from.

It is common knowledge that, Gen. Choi Hong Hi used certain concepts borrowed from physics (his "Theory of Power") and promoted his Taekwon-Do as a "scientific martial art".

He was neither the first nor the last: some will remember Master[2] Masatoshi Nakayama's explanations of Shotokan Karate techniques, which borrowed terms from physics. Also, goes without mentioning the well-known "scientific" basis of Judo itself. Furthermore, Wing Chun Kung Fu has claimed to be scientific in the way its (vertical) punches are combined with its aggressive footwork, deflective defenses and close quarters fighting; Hapkido boasts the most practical use of anatomical weaknesses of an opponent during combat; Blauer's SPEAR system claims to be solidly based on behavioral studies on how human beings naturally react to violence from psychological and physical perspectives.

In sum, at this point most martial arts propose varied and very different techniques and training which they all claim to hold "scientific" status. How could this be possible? The key is that they establish certain goals and training methods based on their own definition of what "rational" or "scientific" means (for the purposes of this article, I will consider them synonymous).

The problem that demands an answer is real combat. Real unarmed combat is a variable circumstance, very difficult to define in precise terms. Certain typical elements such as violence, suddenness, chaos, survival attitude and unexpectedness help to approach its nature. Martial arts offer different approaches to train for real combat; some more successful than others, as street anecdotes tell. After a reaching to a basic definition of a martial arts approach has been adopted by identifying the central elements to be addressed by such martial system, it may be possible to improve the quality of training in general, and of techniques in particular, by using drills and motions consistent with the adopted approach. In such context science –better stated as the "empirical method"- may be of great help to conduct a "trial and error" procedure in certain specific training areas. So although combat involves too many variables to be

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[1] This is a slightly improved version of the article published in Totally Tae Kwon Do Magazine on May, June and July 2010.

I want to thank Germán Pennimpede and Sensei Claudio Iedwab for their insightful comments and suggestions in the preparation of this article.

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The author is currently not a member of any international Taekwon-Do organization.

[2] Many renowned experts are mentioned in this article, some of which are often referred-to as "Grandmaster", following a trend much in vogue in the United States these days. For simplification and unification purposes I call them "Masters", without prejudice of the admiration or respect they deserve.

subject to an entire, all-encompassing scientific study, it is indeed possible to use science to study the correctness of the adopted motions under certain defined guidelines.

Until a couple of decades ago, each martial art was typically distinguished by its techniques. During the last three decades the public has become more knowledgeable, and "fine techniques" are not enough for martial arts training to pass the newer, more demanding "rationality threshold". Nowadays, a martial art is expected (a) to have been used in real confrontations, (b) to have a sound rational explanation and a detailed manner of execution and the reasons supporting their choosing over other techniques, and (c) to be a part of a consistent, coherent system which is taught through a rational, progressive and standardized training method. That is to say, the public has gradually been taking martial arts training to higher levels of combat efficiency by including realistic training scenarios, design of adequate training drills, progressive training curricula and execution of techniques considering the dictates of physics.

Good Taekwon-Do complies with all of those requisites, but as far as the third requisite is concerned, it happens that it is the instructors that sometimes fail to learn it as a system (instead of a group of techniques) and consequently they are unable to convey training with sufficient combative value to their students: knowledge of the system and the internal relationship of its components is a prerequisite to teach a martial art. In his time, General Choi identified the key elements of the Taekwon-Do system in the "Composition Circle", but that is not enough; describing the elements of something is not the same as explaining how it works. The problem with explanations is that martial arts may only be properly understood through practice, and our understanding of the Taekwon-Do system depends on how many times we spin around the Circle wearing our dobok. Gen. Choi understood this himself; in a seminar, after someone referred to his famed Encyclopedia as the place where answers would be found, Gen. Choi admitted that "you cannot learn from a book". An instructor with inside knowledge of the system and an appropriate teaching method is vastly superior to someone who only knows the theory of techniques, even if he can explain them.

The author with Gen. Choi in a seminar in 1996

We must remember that Karate was practiced in Korea in the 1950's under the names of Tang Soo Do or Kong Soo Do (pronunciations of the two Chinese characters used for writing "karate" in Japanese). Being a nationalist, Gen. Choi insisted on a new name for the martial art he was introducing in the Army. Although during the 60's Choi (and other masters) started creating new patterns, Shotokan kata were vastly predominant, and in all truth Korean Taekwon-Do was then virtually transplanted Shotokan. Without considering aesthetic details, it is hard to recognize technical differences when looking at the pictures of Shotokan Karate and Taekwon-Do, especially photos before 1970.

The second Director of the Chung Do Kwan, Master Song Duk Son, shows his "old school" skills

After Korea's liberation from Japan, Gen. Choi was obsessed with providing his country with the best martial art possible, one superior to Japanese Karate. At one point, he resorted to the knowledge of physics he acquired during his military career to explain and eventually develop his Korean Karate. Hence the Theory of Power –the core of Taekwon-Do's publicized "scientific" status-. Although it quite arguable, Gen. Choi's followers today will make a point in the sense that although all martial art techniques may be analyzed from the perspective of physics, Gen. Choi's Taekwon-Do was the first martial art in which attention to physics had a major role in the design of its techniques. The early development of ITF Taekwon-Do (at that time, Chang Hon Taekwon-Do) can be described as an effort of a group of highly trained Koreans at the Oh Do Kwan to improve Japanese Karate techniques under the demanding eyes of Gen. Choi and Major Gen. Nam Tae Hi. And improvement, in their view, was defined in terms of striking power and "characteristic beauty". Unless referred otherwise, in this article Japanese Karate and Shotokan are interchangeable terms, since only Shotokan influenced ITF style. Earlier forms of Okinawan Karate were mostly unknown in Korea at the relevant times in the origin of Taekwon-Do.

Many years after Gen. Choi toured the globe with a group of amazing experts showing the power of Taekwon-Do, at a time when the art had already made itself a name among other oriental disciplines, Gen. Choi made the final polishing of the style. For the purposes of concentrating his "legacy" in a characteristic, he needed an essential concept that would mark the difference with Karate and WTF Taekwondo. He found it in the mid-1980's, when he formalized the "sine wave" ("hwaldung pahdo") type of motion. The sine wave is the way basic technique is performed in ITF Taekwon-Do, and it is credited to take full advantage of bodily mass, speed and coordination for the unleashing of powerful strikes.

Therefore, the point to sort out in this article, as politically incorrect as unavoidable, is whether or not Gen. Choi succeeded in improving his martial arts basic technique "kibon" (Kor.) / "kihon" (Jap.) over Karate's.

It is known that in free sparring / freestyle combat it is not possible to isolate or separate technical components from psychological, strategic or entirely bodily response features (these last three should not be considered for our analysis). Then, we would believe the natural arena for such comparison is breaking competition. But although ITF-style breaking champions have consistently shown impressive power in their techniques, there is no evidence that they actually move differently than practitioners of other martial arts (Japanese Karate or any other) when attempting to strike an object at full power. Actually, pre-sine wave Taekwon-Do instructors –those of the "good old" Korean Army days training with an actual no-nonsense warrior mindset for Vietnam war purposes- used to strike as hard as their contemporary ITF colleagues.

So… Should we conclude that the "Theory of Power" and its manifestation through "sine wave" was just a smart commercial strategy by Gen. Choi with little technical value?
No.

Are there any effects in striking when comparing the classical JKA Shotokan Karate method with the ITF Taekwon-Do sine wave method?
Yes.

Has there been an improvement in technique after the introduction of the sine wave method? Does this make Taekwon-Do superior to Shotokan?
Yes and no.

Let me first clarify that I am a big karate fan, proud collector and avid reader of all classic publications, old and new, on the subject. Actually, I find it hard to conduct any serious study of traditional Taekwon-Do without paying careful attention to Shotokan Karate and its Okinawan predecessors. Therefore, as close to Karate as I feel, I understand we need an honest answer to these questions.

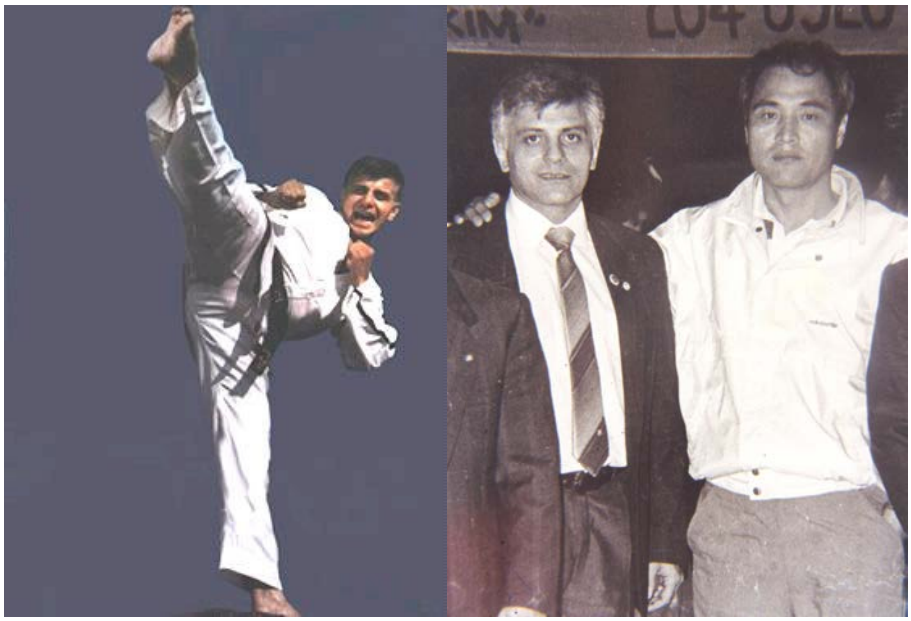
I will digress to elaborate on this. In my early days as a student I was exposed to Moo Duk Kwan training (the lineage coming from Master Hwang Kee and mostly seen in Tang Soo Do), with occasional visits of Karate instructors who used to come not to "learn Taekwon-Do" but to take useful, practical elements they could add to their fighting toolbox. I watched and learned. Above green belt level we were expected to swiftly combine four consecutive blocks and a strike while advancing or retreating in one step. The very first time I saw the ITF sine wave was in a visit of Master Tran Trieu Quan at our dojang –at that time we were members of the ITF-. I could simply not understand his extreme softness and bouncing, so different than the hardcore hyung I appreciated. He unexplainably seemed to enjoy doing just one technique per step, with no hurry. At the end of my high school I started collaborating with the local martial arts magazine, and many times my English language skills put me as informal translator of Korean martial arts masters visiting Buenos Aires. Sometime during 1987 I attended a seminar imparted by Tang Soo Do Master Hwang Hyun Chul, and witnessed the kind of hardness/softness balance of his traditional style. He would turn his hips while striking and performing open-handed defenses, drawing figure-eight patterns in the air, finishing with crisp, sharp, straight punches. Fast, strong and elegant, a blend of Korean, Japanese and Chinese style packed together, simply beautiful. A couple months later I had the chance to see the ITF sine wave once more, this time performed by Master Park Jung Tae, who appeared to move in a "heavier" manner than Master Quan's, which resulted in a display of impressive power. In practical terms the sine wave meant "one technique per step", and it was hard for me to accept that as a formula for advanced martial arts. Before my eyes Master Hwang's approach looked faster, as powerful and more versatile, so I felt it was compelling evidence that the traditionalists ought to be right

At left, Master Park Jung Tae performs a side kick (1987). At right, the author with Moo Duk Kwan founder Hwang Kee and his son Master Hwang Hyun Chul.

Why would ITF proponents take so long to perform only one technique, bouncing around, while the "Korean traditionalists" would swiftly link an efficient combination of several consecutive blocks or strikes taking the same time? Why dared they change the preparatory motions in blocking, altering long-standing motions for the sake of dubious innovative mechanical advantages? While experts were saying that as far as code-breaking patterns (forms interpretation) were concerned, "a block is not a block", Gen. Choi was busy improving blocking against the trend. He seemed to oppose things over which both traditionalists and evolutionists agreed. But I could not totally discard ITF style, not only out of obedience to my master,

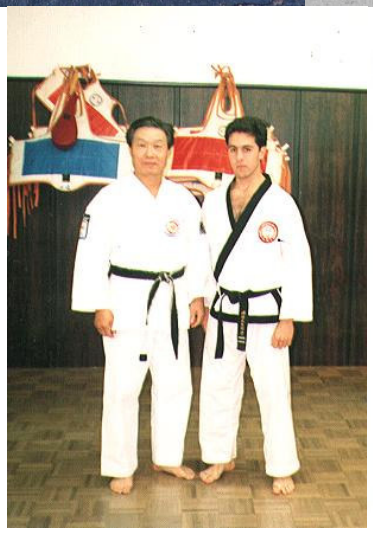
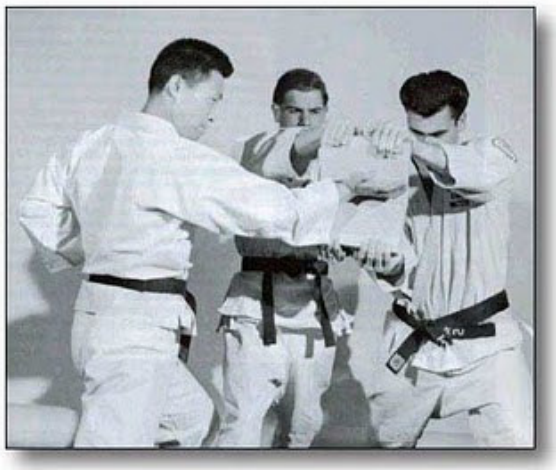
but most importantly because at the bottom of my heart I also liked it. Even under Master Shigeru Egami's Shotokai tradition, Master Quan's suppleness did make sense. All these masters' motions apparent contradictions provoked admiration and confusion in me.

My Taekwon-Do teacher Master Pedro Florindo, a skilled technician with impressive martial art knowledge, avoided giving me a clear-cut response to ease my doubts. I had labeled him as a Moo Duk Kwan traditionalist (although he never made references to "styles"), but he was one of the heads of the ITF in Argentina. His performance was hard to classify, too relaxed for Tang Soo Do standards, not as "bouncy" as ITF proposed, and at black belt level he subtly encouraged us to try the ITF style. Florindo was –and is- a seeker of truth, and he refused to abuse of labels (ITF, Moo Duk Kwan or whichever).The explanations given by Gen. Choi's in his seminars were consistent but did not answer all of my questions. People surrounding the General failed to be inquisitive enough. Maybe there were too many commercial-driven people, too many hypnotized with the legendary Gen. Choi, but very few actually willing to critically analyze ITF style. The usual answer was "he is the founder", and that aborted any further possible questioning. That certainly did not help me to appreciate ITF Taekwon-Do as a sophisticated martial art.



Master Pedro Florindo, 8th Dan. At right with his teacher Master Lee Chong Seo.

Maybe the ITF was making the style simpler and accessible to everyone, I thought. After all, "traditional" Karate (Korean or Japanese) standards, when performed by their most distinguished proponents, looked tougher and richer. When addressing patterns, the ITF seemed to replace analysis of combative applications with analysis of motion, and I was more interested in self defense than in motion analysis. Taking a class with Master Kim Soo (head of the Cha Yon ryu, a complete traditional martial art system with headquarters in Texas which has the same roots as Chang Moo Kwan and Kang Duk Won) some years later further convinced me of the benefits and inner applications of the traditional approach and its connection with a longstanding tradition in martial arts.

The author with Masters Kim Soo (above) and Sihak Henry Cho (below).

When I refer to the inner applications, I do not necessarily mean what is known as "bunkai" (form interpretations, "boon hae" in Korean but better called "hae sul" by my friend Stuart Anslow). I also have in mind to combative use of the transitory moment of formal techniques. Soft and hard, *um* and *yang* phases follow one another. What is typically considered preparatory stage at inhalation is the soft phase, and the execution stage of a classic Taekwon-Do or Karate strike or block is the hard phase. In the older Okinawan Karate tradition, the soft stage was deemed to include subtle and deflecting defenses, grabs or joint manipulations coexisting with the following powerful hard stage. Beyond the specific applications in each form, awareness of the soft phase in Taekwon-Do training –achieved by combining fast, precise consecutive techniques- provides the coordination necessary for close-distance fighting, as found in Kenpo, Kali or boxing drills. In view of the consistency and value of the "traditional" training I received, I kept doing my ITF patterns with a "not-so ITF" style, with the blessing of respected traditionalists. Actually, high ranking Korean masters dismissed ITF as "simplified martial arts not including combinations in their patterns" (yes, of course, combinations may be found, but their slow rhythm deprives them from been "combinations" from a fighting perspective).

But, as convinced as I was, I could not ignore the awesome power displayed by the best ITF exponents. I was particularly amazed at suspended breaks or jumping techniques destroying hard materials by small masters. I had heard once from my teacher that controlling the hips as a source of power without needing to be rooted to the ground was a sign of good Taekwon-Do skills. If that was the case, that area of Taekwon-Do skills could certainly be found in the Korean ITF masters. And at 62 kilos, I would be grateful if something could increase my striking power. If my technique was as good as everyone said, better than average black belts… why could not I be truly very powerful, stronger than average black belts of my size? At that time I didn´t know, but critically looking at myself and my training was making myself ready. And, as they say, only when the student is ready the lesson is presented.

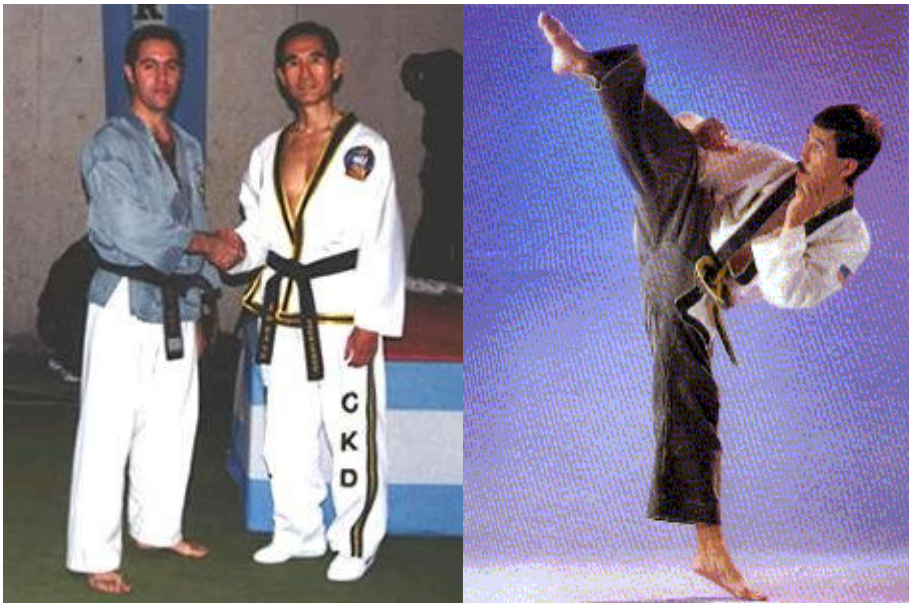
ITF Taekwon-Do and Sine Wave as "Sequential motion":
More power than what meets the eye

By Manuel E. Adrogué

Part 2

In this three-part series the author discusses technical reasons underlying the transformation of Shotokan / Korean Karate technique into Chang Hon (ITF style) Taekwon-Do, and shares his personal story on how an inquisitive attitude, the exposure to certain martial arts icons and diligent training gradually changed his perception of Taekwon-Do technique as it relates to striking power and speed.

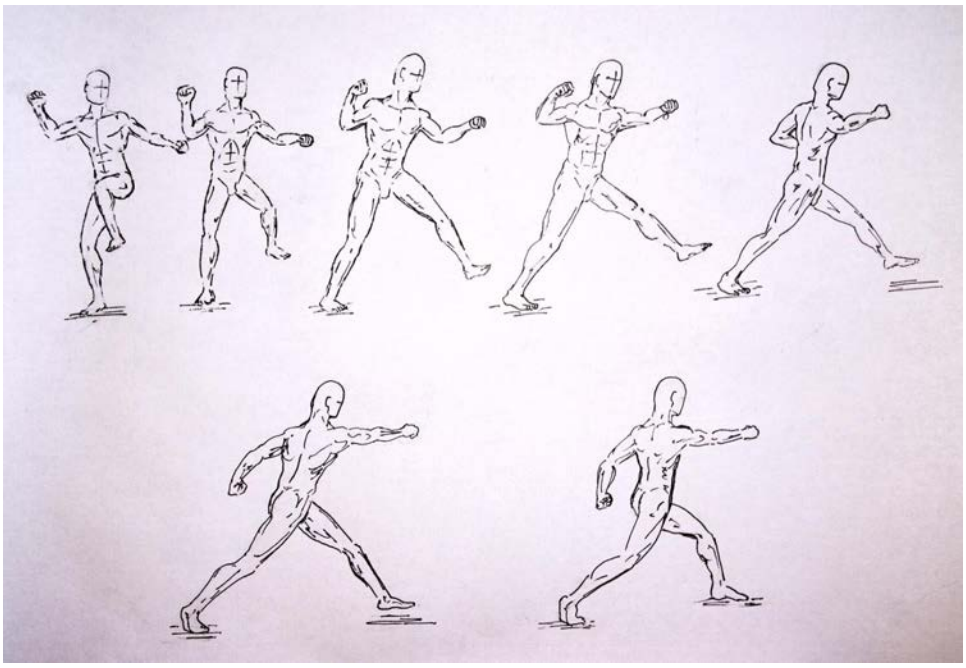
When I was about to enter my third decade of training, two things occurred: (1) I met "biomechanical" Master Kwang Jo Choi and in some very interesting conversations and a seminar, was introduced to his Choi Kwang Do system, and (2) I received a copy of the "Original ITF Masters" footage video, filmed during the sixties and seventies -which coincidentally includes Master K.J.Choi-. I analyzed Choi Kwang Do, saw its videos and had an additional personalized class with its local representative Mr. Giarone. In essence, Choi Kwang Do proposes achieving striking power through sequential motion. Imagine a pitcher about to throw a ball: after he winds up raising his left knee (as a cartoon character in preparatory position before running), he will unwind from his central axis, rotating and stretching his pectoral muscles until his arm behind him bounces forth flexing his chest as a catapult –shoulder, arm, hand- to throw the ball. Golf also uses this "hips before hands" approach. Similarly, the sequential motion applies this elastic quality to striking technique. Different muscle groups will stretch and contract successively, as a wave of energy runs through the body as a whip.



The author with Master Kwang Jo Choi.

Choi Kwang Do is a new martial art based on the findings of Master K.J.Choi, aimed at natural, extremely powerful motions and the optimization of its students' health. Its approach is simple, but incredibly attractive: empower all students (kids, young men and even elderly ladies) to strike with overwhelming, unbearable force. Much of the training is done striking focus mitts. It emphasizes large weight shifts towards the target in all of its punching and kicking techniques by successive displacement of all joints involved in the kinetic chain, each segment achieving peak velocity prior to the following segment. A couple of years after my first exposure to Choi Kwang Do, I accessed its official manual. It describes a

study performed in 1992 at the Colorado State University on the biomechanics of a traditional (Karate style) reverse punch compared with the Choi Kwang Do punch. Four first degree black belts with similar training time in their systems (two in CKD and two in "traditional" Taekwondo) were filmed and sensor straps placed in their joints, striking a power plate (I will refrain from including non-relevant additional data). They executed their strikes several times. The force exerted by the CKD proponents was in average almost three times the force exerted by the traditionalists –some results were even greater on the CKD side-. Although final hand speed was about 25% superior, the major difference was found in that the total combined displacement of the involved joints was 50% larger in CKD than in traditional style. To put it in other words, CKD proponents sequentially rushed all their body parts against the target, while traditionalists relatively stayed in place. Another interesting information is that the traditionalists started moving their fists with their initial motion as if forming one single block, while those of CKD held theirs until correct time to enter into the sequence to play their part. (Note: I am not interested in defending the scientific validity or correctness of the experiment, which may be subject to several methodological objections. Notwithstanding its limitations, such study is a relevant fact that must be considered when addressing these matters, specially since from the strictly logical perspective, in my opinion its results "make sense").



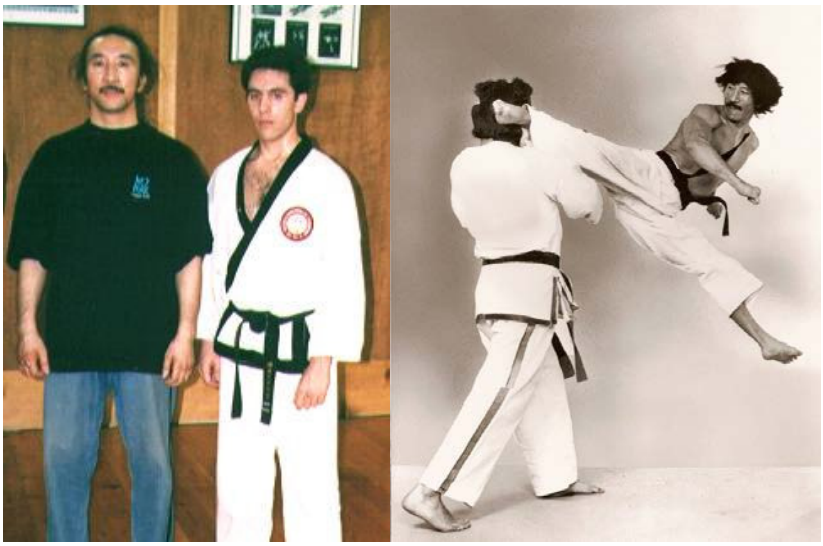
The natural motion for unleashing a "super punch" shows a wide arc and lagging of the hands (proposed by ITF), the pushing off by the rear leg and hip rotation (proposed by Shotokan), and moving the head and body into the target with the hands covering the distance in a "last minute catch up". At the end of this forward shift the bodyweight is driven into the target, with impact before the leading foot lands (note that the final drawing is a "frozen position after impact", not a natural follow-through stage). This concept most probably inspired the ITF sine wave, and is proposed in its most genuine form by Choi Kwang Do.

When I went back to the "Original" masters video, I found the initial germ of the sequential movement identified and amplified to revolutionary proportions by Master K.J.Choi. Looking at those old videos and reviewing all my mental classifications, I understood that the sine wave was a new and finer package of what Gen. Choi's Oh Do Kwan members had been doing since long ago. What I had until then considered "traditional" was just the style proposed by the Moo Duk Kwan, Chang Moo Kwan, Song Moo Kwan and Ji Do Kwan. But the Oh Do Kwan (an offspring from Chung Do Kwan) through those "unpolished" patterns of old was showing me the seed of ITF's sine wave, something different than what was known as Korean or Japanese Karate.

Those features matured into what may be better appreciated by contrast:

1) In Choi's Taekwon-Do basics, each technique aims to express its maximum striking potential, without the "real time" explosive combinations as found in Shotokan Karate;
2) In Taekwon-Do hands are not suddenly shot at the target at the very beginning of the technique to avoid "telegraphing" (a feature of Japanese Kendo rarely found in Okinawan Karate styles); Gen. Choi insisted that motions would begin at the trunk (torso / hips), kinetically charging the technique by adding segments seeking maximum power in the confluence of acceleration and mass in a properly aligned structure upon impact (with exhale);
3) That the rhythmic "tai no shinshuku" (expansion and contraction) of Karate would be bold and extreme, to the point of discarding the principle of height maintenance cultivated in Shotokan;
4) That in Taekwon-Do patterns / forms, all movements should be executed following the same guidelines, thereby supressing any differences in the execution of patterns derived from diverging interpretations of the forms (putting an end to the problem of an individual performing a motion in a pattern interpreting it as an armbar would use different intensity, speed and angle than one doing the same motion considering it a strike); and
5) Training of jumping abilities and emphasis in relaxation and flexibility –favored by the introduction of complex kicking techniques- gave Taekwon-Do specialists mastery of their motions to the point of being able to strike and kick powerfully in midair, accelerating hands and feet and using their hips / center of gravity without need of being connected or rooted to the floor, traditionally considered essential by Shotokan specialists.

The concept to bear in mind is that while <u>in its basics</u> Karate is "sudden-fast-powerful", Taekwon-Do is "sequential-very powerful".



With Master Hee Il Cho, an exponent of the earlier form of ITF style who is recognized for his extremely powerful technique and realistic approach to Taekwon-Do.

The execution principle for an ideal Taekwon-Do technique is that body parts (hips, shoulder and especially the striking hand) must arrive at the moment of impact each at its own maximum speed and with proper structure (direction and alignment). For the purposes of this article, I will exclusively refer to hand strikes, although the same principles apply to all other techniques; including kicks.

Imagine that you are told to make your hip and fist arrive at impact point simultaneously, making sure that each reaches its maximum speed. Let us say that after some attempts, your best mark is achieved with a sequential type of motion, quite wide and strong punch, that takes 0.40 seconds from start until completion.

Now consider that you are given a restriction: you are told that for "combat reasons" (surprise element) you are not allowed to delay the starting motion of your fist, which may only move forward, and that you must achieve simultaneous arrival of both in as little time as possible. Now let us assume that after some attempts in which your hands were too fast, you achieve your best mark with a strong punch that was considerably faster (0.30 seconds, 25% less) than the non-time-restricted marks (these estimations are based on actual experience).

At this point –and please indulge this oversimplification for explanation purposes- you must have realized that the basic technique in Taekwon-Do is somehow stronger but relatively slower, while the Shotokan karate type is faster but maybe not as strong (by "fast" I mean a technique that takes little time from start to finish, which is different to the final "speed" of the striking tool). The Karate manner is probably more realistic, since you need a very strong and fast punch, not an immensely strong punch that may take too long to connect and may be easy to anticipate or evade. In combat, the power to break five boards is not necessary. Snake-like, sharp and accurate strikes are most recommended. But this is relative to the practitioner: the requirements of a heavyweight be properly addressed by the Karate punching approach, while lightweights will get some useful extra-power from the ITF Taekwon-Do punching way.

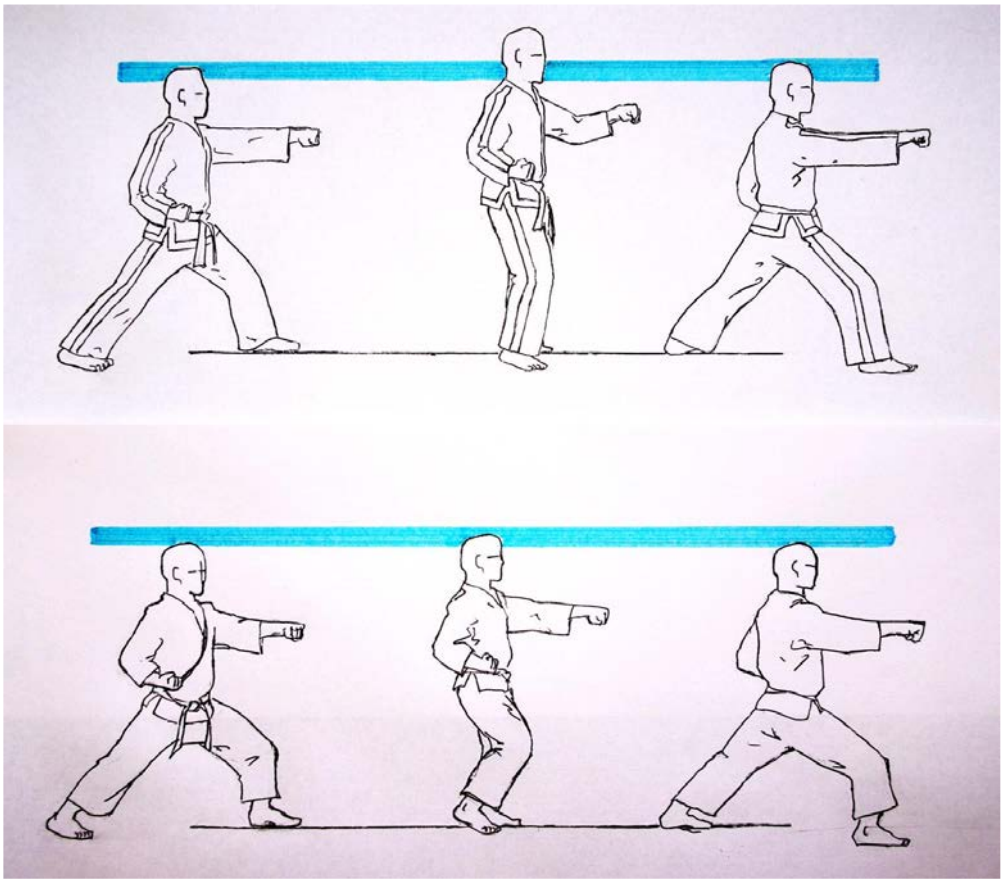
Actually, since reflexes (reaction time to a stimulous) have been estimated to take, at best, 2/10 of a second, according to Gen. Choi's 1993 *Encyclopedia of Taekwon-Do* (3rd Edition, Vol. 2, pages 40 and 43), a fast strike darting to the target without evidencing major motions will be very difficult to block or avoid, unless it is detected before it starts. Such early detection, according to Gen. Choi's teachings, should be found in the eyes of the opponent, not in his hands or feet. Alternatively, Filipino knife fighters teach that for early detection the fighter's attention should be focused on the chest of the opponent. Note that the referred body parts are located at the centerline of the body, the source of any torque-like motion, so in essence the teaching is similar (although the eyes may convey other additional relevant information). Actually, in martial arts competitive training experienced coaches will tell that once the first one-third of an attacking motion has been covered, it is too late to block or avoid the strike, even if you "see it coming".

From the practical perspective, the faster, more explosive strikes of Karate are the best; ITF Taekwon-Do strikes rank second, and the most powerful Choi Kwang Do punches, unleashed only at full momentum, come after them, for being the most detectable.

But in Gen. Choi's view, power "is king" regardless of the time it takes to generate it (it boils down to his personal choice). He wanted the most powerful and beautiful martial art. The Taekwon-Do standard was built on massive board breaking, not on chronometers or Japanese kendo-inspired tournament rules. And, as I have learnt, Taekwon-Do is an art of extremes. Breathtaking jumping kicks, powerful breaking demonstration, massive student gatherings, and sometimes painfully low standards.

It should be further noted that this conceptual distinction of the different approaches of ITF style and Shotokan is somewhat blurred in real life: Not only because ITF stylists consider their basics simply as a training tool that is much adapted and toned down in actual application in violent scenarios –while in contrast Shotokan stylists aim to apply their motions exactly as practiced in their basics-, but also because experts of both schools have shown to be fast (economic in motion) and powerful. The examples that come to my mind are the legendary Shotokan Master Taiji Kase, and ITF Master Son Son Gun (check out their videos on the Internet).

Masters Taiji Kase from Shotokan Karate and Son Son Gun from ITF Taekwon-Do.



<u>A graphic comparison:</u> Although the length and width of ITF (at top) and Shotokan (below) stances are not particularly different, their "look and feel" sets them completely apart. In the Karate model (JKA Shotokan, 1970s) the stance is pressed downwards, feet firmly rooted. The karateka pushes himself off, in the intermediate stage compressing the hips to the ground and arms tight to the torso. Like a spring of muscles, he dashes forward towards the target placed at the solar plexus, driving a corkscrew action. His back leg propels his hips into the target with forceful abdominal contraction upon contact. In the Taekwon-Do model (ITF 1990s) there is no evidence of effort or "internal friction". Arms revolve loosely near the side of the body, and feet never get any closer than shoulder width. In the intermediate stage the head is higher than the Karate model, with knees slightly bent before a subtle, gentle drop of the body at midpoint helps it to bounce up into the "sine wave" motion. The action is felt as if falling with full force against the target using both bodyweight and acceleration of the hands. The target is placed at the horizontal plane, a little off-center. Earlier versions included ostensible hip rotation, which was eliminated by Gen. Choi (arguably for differentiation purposes) during de 1990's. Even at similar final lengths, the Shotokan stance is lower, with a sharper angle in the forward leg. Present day ITF has lost much of its 1970's aggressive features, although experts today can identify and preserve certain key elements in the modern version through subtle but critical details.

I must also point out that at the time of this article, the relatively ample swinging of the arms to gain momentum, and the focus on power as a central aspect of the golden-age Taekwon-Do have been drastically reduced. Today it is usual to see "sine wave" specialists that mimic certain gestures while ignoring the reasons and purpose that Gen. Choi originally had in mind for them when first conceiving the sine wave.

Going into more detail: the ITF Taekwon-Do technique has a preparatory stage in which the center of gravity is released from the ground and the hips slightly turn sideways (chest facing 30° to 45° angle) at the point where the Taekwon-doin is starting the new technique (all previous upward motion served to recover the center of gravity that had been lowered in the previous technique). When advancing in Taekwon-Do patterns, that initial stage of technique itself is located at the exact midpoint between the

completion point of the preceding technique and that of its subsequent. The following is mostly conceived as a falling (from natural "parallel" stance to front "walking" stance, to the ground instead of pushing off-the ground as experienced in Karate forward motions), relaxed yet heavy motion, sequentially uncoiling hips, waist, shoulders, arms and forearms while exhaling.

A slow motion view will show that the hands are temporarily held back while the hips turn forward, but the superior speed of the hands allows the catch-up at the very end of the motion. Sequential motion will affect the path of the limbs causing that in an ITF direct punch the corkscrew expected in Shotokan is altered to timely fit into a sequence. At the same time the torso rotates and the axis moves forth separating from the hand, the half-clenched fist will be kept in an "inertial lag" at chest / shoulder level (which is considered a mistake under the Shotokan perspective). So the ITF front strike is not direct from chamber position at the side of the body to the target, and emphasizes matching the final maximum acceleration of the fist with the sinking of the bodyweight and turning of the hip into the target. That means, the impact is supposed to occur when the advancing foot is planted, but a fraction of a second before the weight is dropped to the ground (because bodily mass must be applied to the target, not to the floor).

Physical phenomena can be interpreted differently. The sequential motion is the reason why in a Choi Kwang Do punch the rear leg knee is bent with the corresponding plantar flexion of the foot. Some have argued that keeping the back leg straight is biomechanically incorrect. I agree, especially if "straight" means "stiff". The leg should not be kept straight; the knee should timely bend to channel the wave of energy (part of the "knee spring" concept used in ITF), not leaving all the work to be performed by the hips. But if you are familiar with waves, you know that whiplike motion means that the pieces in a sequence go back to their original place (remember for example the wave performed by soccer fans at stadiums, or the break-dance way). So once the knee has moved, it does not need to freeze in a bent fashion. Taekwon-Do and Karate stances work for exerting force while stepping forward or backwards (otherwise, there would be a strong case for leaning forward when striking), through a solid structure, completely compatible with speed but not needing speed in all applications (I refer to pushing and other forms of unbalancing). Gen. Choi's contribution towards an increase in power was an innovation within the Japanese Karate technical tradition (so certain pieces that were not included in Gen. Choi's basic puzzle may be of good use for diligent ITF stylists), whereas Master K.J.Choi's innovations have taken power to such priority level in their scale of technical values, that they have broken away from the Karate lineage and adopting a different equation on how its martial art is made up in terms of sparring, stances and training methods.

In actual practice, many times stylistic differences are blurred. A Taekwon-Do *bandae-jirugi (*reverse punch) seeking speed and maximum power is not very different from a Shotokan *gyaku-tsuki*.

ITF Taekwon-Do and Sine Wave as "Sequential motion":
More power than what meets the eye

By Manuel E. Adrogué

Part 3

In this three-part series the author discusses technical reasons underlying the transformation of Shotokan / Korean Karate technique into Chang Hon (ITF style) Taekwon-Do, and shares his personal story on how an inquisitive attitude, the exposure to certain martial arts icons and diligent training gradually changed his perception of Taekwon-Do technique as it relates to striking power and speed.

This clearer insight into Taekwon-Do's past and a proposed future (formulated by a former ITF star member as "the evolution of TKD") made big impressions on me. On a very practical level I surrendered to the evidence that ITF style was more powerful than what I had been practicing. Simplified, but stronger. The power of the ITF style was achieved at the expense of leaving aside "advanced" uses of patterns (I could no longer integrate them with certain opponent maneuvering skills, and had to accept a rhythm not applicable in combat) but the result was good. It was the time for me to incorporate that into my training, to learn the other side of the coin.

Since then I have found out other interesting qualities of ITF style by meeting masters that deserted the organization long ago (special credit to Master Mark Giambi, student of Master Kong Young Bo), as well as very proficient current members. I have tried to separate purely commercial updates from useful martial-art-based concepts. At this point I am convinced that the essence of ITF Taekwon-Do basics is maximum power through acceleration in an elastic, relaxed whip-like technique.

With Masters Mark Giambi and Kong Young Bo (2003), jumping at right.

The Taekwon-Do insistence on relaxation is not only explained in terms of the so-called Theory of Power, but probably in the Korean approach to sparring: the ability to change the direction of techniques, or transform them into different motions amidst combat, typically needed in the continuous type of sparring used in Taekwon-Do, asks for relaxed motions. In other aspects, some apparent internal contradiction marks ITF style: Taekwon-Do sparring and patterns function as complementary opposites. Shotokan Karate-type sparring actually works within the same logic of its basics and forms: two karateka will face each other knowing what the other will probably do, but not <u>when</u>; two taekwon-doin will face each other not knowing <u>what</u> to expect due to the variety in their technical repertoire. So karateka will be educated in fast non-telegraphed motions, and their breathing pattern will be disguised to conceal their weakness moment ("kyo"). Actually, karateka will hide his very intent until it is too late for his opponent in awesome

duels of dramatic stillness followed by explosive attacks. So breathing during Shotokan kata will not be as evident, rhythmic and predictable as ITF Taekwon-Do's tul breathing pattern; a typical rapid-fire combination of Shotokan Karate will not spare precious fractions of a second to inhale before each strike.

Another difference between ITF Taekwon-Do basic technique and that of certain Okinawan Karate systems is that while certain older approaches included isometric strength exercise motions within the forms, ITF proposes "zero friction". Repeating basics with high chamber of the fist to the side of the floating ribs may be an excellent way to develop a strong triceps muscle and thus an explosive, powerful punch. But for total relaxation, an ideal (most powerful) strike would recommend lowering the chambered fist to hip level, and that is the ITF Taekwon-Do way. In ITF patterns there are no physical conditioning exercises, no applicable combat strategies, there is no hurry to conform to fast combat rhythm, just perfectly balanced, powerful techniques using all time they may need. Additionally, the emphasis on relaxation in ITF Taekwon-Do, to the point of completely shunning muscular force, educates students in correct habits of motion. The ITF way of performing patterns resulted from Gen. Choi's observations of Karate and his own early Taekwon-Do disciples, whose performance may have evidenced a very common mistake: the tendency to "imitate" power by stiffening muscles instead of generating, channeling and releasing power through and out of the body, into a target. To overcome such usual temptation, usage of force has been completely banned in modern ITF patterns. Consequently a new temptation arises for modern ITF stylists: that ITF sine wave –updated and embellished endlessly since its inception- becomes a dogma instead of a means to a powerful and natural technique. This temptation might be worst than the former, since a stiff but decently strong technique is combat-wise preferable to an elegant, flowing but ultimately useless martial art technique. The exaggerated sine wave syndrome has reached to epidemic levels among ITF members these days due to the fact that during the early nineties the sine wave was used as a political tool by Gen. Choi to mark those that had departed from the organization (see Alex Gillis' *A Killing Art: The Untold History of Tae Kwon Do* (ECW Press, 2008) page 144) and since then a vast proportion of "loyalists" have made their best efforts to keep and increase such distinction. Actually, Gen. Choi himself during his last years introduced certain elements into the sine wave that aimed towards improving aesthetic qualities and polishing "style" beyond combat-oriented concerns.

It is interesting to note that, according to Bruce D. Clayton (*Shotokan's Fighting Secret. The hidden truth behind Karate's fighting origins*, Ohara Publications, Burbank, 2004), Shotokan resulted from the transformation by Shorin Masters Matsumura and Itosu of earlier Karate models based on Chinese Ch'uan Fa "complex applications-oriented" criteria into a linear, power-oriented modern Karate that eventually became Master Gichin Funakoshi's Shotokan. So analysis of body mechanics for increasing power at the expense of in-depth study of forms applications was to some extent part of the DNA of the type of Karate that landed in Korea. Gen. Choi added one significant step in the same direction.

Left: With Gen. Choi and Master Park Jung Tae (Buenos Aires, 1987);
At right with Masters Van Binh, Tran Trieu Quan and Ung Kim Lang (Houston, 2003).

As said in the beginning of this article, all martial art techniques are subject to the principles of physics. I am not a specialist in that field, but I will resort to the Internet and my limited schooling for the following bullet points to enter into another important concept of ITF Taekwon-Do basics:

- Newton's First Law of Motion states that for the motion of an object to change, a force must act upon it, a concept generally called inertia.
- Newton's Second Law of Motion defines the relationship between acceleration, force, and mass.
- Newton's Third Law of Motion states that any time a force acts from one object to another, there is an equal force acting back on the original object in opposite direction.

Until here I have referred to matters pertaining to the Second Law. Now, I want to focus on the Third. A probably unique characteristic of ITF basics is the use of the "compensation" or "reaction" of the techniques. Paraphrasing Newton's words, "*To every action there is always opposed an equal reaction; or, the mutual actions of two bodies upon each other are always equal, and directed to contrary parts."* When striking a solid object (such as a padded wall) horizontally with our fist, we may allow ourselves to dive into the target, since such object shall resist and prevent us from falling forward, providing the reaction that will cancel our action. Now imagine a person who wants to strike with full power to the air. An untrained person, if earnestly committed to the strike, would loose its balance, and for that reason will intuitively use a circular strike (a hooking punch) because it is powerful and easier to control. If a strong, direct, full power punch is asked –as in the karate tradition-, this person will find no resisting object or person at the end of his strikes, and therefore he will have to provide his own "reaction" to compensate the technique and maintain proper balance. That is what we do in forms (tul, poomse, hyung, kata). That reaction has been typically identified with the clenched fist at the side of the body in a sort of back elbow strike, known in Karate as "hikite". But that is just an example, and not the concept itself: the back elbow action is not reaction; simply the most visible way of compensating forward-driven techniques in Taekwon-Do. Actually, the ITF redesigned many techniques originated in Karate so that, for example, a circular strike moving inward with the right hand would be cancelled by the left hand also moving inward (same path, opposite direction) –the second move in Won Hyo and Toi Gye tul are good examples to this. In outward techniques, the symmetrical opposite limb will also move outward. So, although it is not a fixed rule, a forward motion will be cancelled by a back-oriented compensation and viceversa, and side motions will follow similar principles. That is what explains why many ITF techniques have abandoned the original "flavor" of Shotokan or Okinawan Karate when the motion of certain part of the body is no longer explained in terms of combat (grabbing, striking to the other side, etc), but exclusively on the physics of power.

When punching, a target will provide the reaction against the fist.

ITF patterns include several ways to provide a reaction for "cancelling techniques" (in the picture, three alternatives for a front fist strike in sitting stance).

For these purposes, let us consider a suspended board or brick that we want to break with a direct punch. While in a fixed breaking several people (or an apparel) will provide resistance to the strike –so the alternatives will be either broken boards or a broken fist-, in suspended breaks a strike lacking enough speed will simply push the object away. Actually, most of the strikes we see in fixed breaking demos would fail the suspended test. The objective is that the fist goes through the target in the same way a bullet would. The key word is speed upon impact –not a fast, non telegraphed motion, since the concern is not that the boards will move-. That is a confusion widespread in the martial arts community: Talking about speed, being fast to draw the gun must not be mistaken with the velocity of the (killing) bullet. Have you ever seen how experts actually do the suspended break? The specialist will take one or two steps towards the target breaking his inertia, go headfirst and in a sudden motion, when he is almost past the line of impact, shoot his (right) fist through while jerking his (right) foot back as if kicking. I've had the honor of taking a class with Master Kim Suk Jun (former member of the ITF Demo team), whose impressive video doing this is available at the Internet in his home page. I recommend you check it out at http://www.sjkim-taekwondo.com

The author with ITF Demo Team member Master S.J. Kim, kicking in the picture to the right

At a point, the suspended fist strike –which closely resembled the traditional Korean downward punch to the chest- served as a revelation to understand the funny "back pedaling" piston like motion found in the

ITF reverse punches (second motion of Do San pattern). I have heard some traditionalists criticize it stating that it no-one would attempt to make a serious break to the front while sliding back. These people are missing the point and have not taken enough time to analyze the motion performed by an expert. Other critics have rejected the straightening of the back leg after it has been bent. I have already referred to how Choi Kwang Do teaches that the back knee should be bent when striking (it is convenient to bend it during the striking motion, but not to let it remain straight at impact). But actually the "back kick" motion in suspended punching breaks gives the answer: adoption by the ITF of sequential motion has an effect in the way techniques are compensated / cancelled. And the secret is that the way you train to cancel your techniques will influence your striking habits. Seasoned martial artists know that proper repetition is the key to mastery. Experience tells that most martial art students practice their forms going through the diagram at probably ¾ of their maximum power. Except when we put ourselves into "performance mode" because we are in a tournament, test, or simply there's someone watching, repetition is done at a logically moderated effort. It is a matter of self preservation or low impact in training. Taekwon-Do forms never meant to put stress in the joints, and powerful striking is not the same as imprudent, forceful execution. Under the traditional system, execution with moderate intensity determines that final acceleration of the attacking or defending tool is neglected during practice, because there is no special motion triggering it. In that system, acceleration is only found in high intensity performances. On the other hand the ITF system, emphasizing an abrupt, jerky extension of the back foot (simultaneous to exhalation, hip & wrist rotation and lowering the center of gravity), compels the student to get used to routinely accelerating his striking tool, even in low-intensity practice of patterns. So the ITF style of training patterns ensures repetition of certain technical gestures that will result in very useful habits for powerful striking. As the student progresses, the importance of his center of gravity (the center from which opposing forces originate) and the control of the body axis becomes clearer and tangible. From the center, one force goes forward and the other, opposite. As I write this I remember Master Hee Il Cho's iconic jump spinning back kick, with a fully extended reaction leg. In the context of modern ITF patterns, any piston motion that leads to sliding back is a big mistake, since the final position of the "back hip" should be slightly closer to the target than in the beginning. The piston motion helps to realize the importance of synchronizing the whole body while keeping it relaxed and vertical (that is very important: the head must not go back and forth), flexing the knees timely, and exhaling. When properly mastered, this motion can be reduced to a minimum, and allow a Taekwon-Do expert to generate power without resourcing to pure mass. An advanced Taekwon-Do black belt should be able to generate power in very short ranges and without using wide stances, even to the point of striking powerfully without a firm base – retreating from the target, in midair, on one foot, etc-.

Instructor Leo Di Lecce performs a spinning jumping side kick.
Note the reaction provided by the extension of his non-kicking leg, and how he controls his body position to ensure a strong impact.

* * *

Power does not substitute coordination. Both attributes need to be practiced, and they are both related to relaxation and fine body mechanics. Before fully turning to modern ITF-style training I was a proficient black belt, quite balanced in terms of power and coordination. A renewed, precise understanding of the practical physics of classical ITF Taekwon-Do led me to modify my training with great results. I am aware that my interpretation of the sine wave is similar, but not exactly the same, as that proposed by the ITF major branches these days. In my case, there is still plenty of room for improvement in both sides of the coin (I have chosen not to discard any of the "contradictory" lessons I received, but to keep chewing them). But I credit the sine wave for certain goals I have achieved. Knowing that I am able to deliver truly powerful strikes without much motion has made a real difference in my martial arts level. Anyone dedicated enough, no matter how small is built, may access such power following proper instruction. That was something very important to Gen. Choi Hong Hi, physically as small and mentally as hard as a pebble.

ITF style may have discarded more training elements than what is desirable, although it is hard to pass judgment over recent history. But it is beyond question the military Taekwon-Do that Gen. Choi once envisioned achieved his goal: to give birth to a Korean martial art more powerful than the Karate he had learnt. He succeeded. And, as they say, the rest is history.