

ITF Taekwon-Do: The Sine Wave, its figures and execution

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I dedicate this work to the memory of General Choi, to Grandmasters Park Jong Soo, Kim Han Chang and Pedro Florindo, as well as to all those who, fighting against their own limitations and circumstances, do their best to build a more peaceful world through Taekwon-Do.

This article has been prepared for the members of our Mudo Jongshin Won organization and the martial arts community in general. I have dispensed with formal citations because it is not an academic work, nor do I intend to persuade or refute opinions, but to provide elements that may contribute to a better practice. I have made an important effort to overcome the difficulties of the graphic medium and capture with sufficient level of detail what I explain in my classes through physical movement, although there are details of combative application that I have been forced to omit.



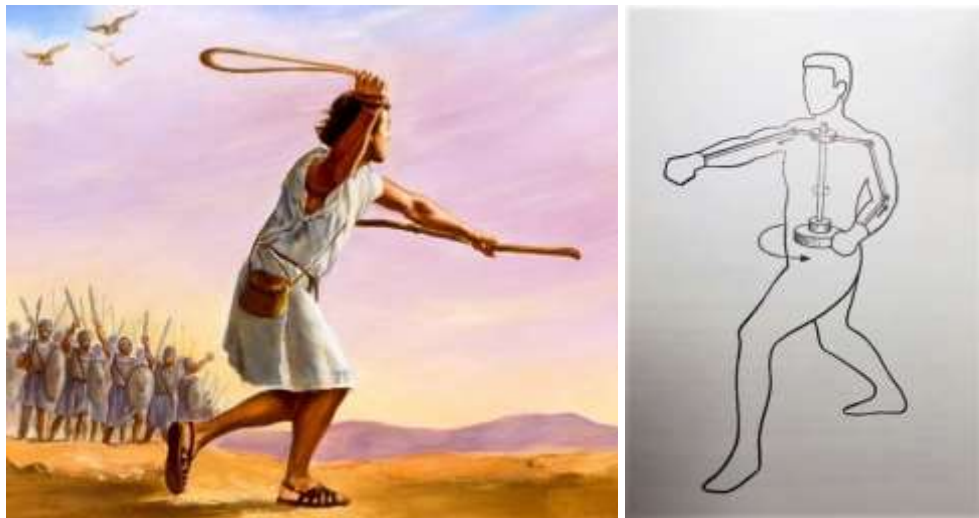
1. Introduction: Shotokan Karate as the Standard for Comparison

The Chang Hon style of Taekwon-Do—commonly known as “ITF Taekwon-Do”—has the sine wave (the “Wave”, *Hwaldung Pahdo*) among its most salient features, which was developed by Gen. Choi Hong Hi. It is a usual subject of conversation, quite controversial and has motivated heated debates. On 2010 I wrote a lengthy paper for Totally Tae Kwon Do magazine, under the title “*ITF Taekwon-Do and Sine Wave as “Sequential Motion”: More power than what meets the eye*” in which I analyzed in depth the reasons and technical goals of the Sine Wave in the martial arts (<http://taekwon.com.ar/wp-taekwon/wp-content/uploads/2019/08/SequentialSineWave2010.pdf>). I understand that today, such work remains fully valid as introductory material to the subject. Since then, new articles have been published and I have continued to practice, study and learn. Through this new work I give more detail to the mechanics of the Sine Wave (which I will also call “Wave”), referring for its conceptual basis to my previous work.

What is the Sine Wave? It is the manner in which ITF Taekwon-Do’s basic technique is performed, which is credited to make the best possible use of bodily mass, speed and coordination to apply extremely powerful strikes. It is a model for 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 electricity that runs through the body. Although the details of the movement are not the same as in the example of the pitcher or golf, the important thing is the concept of “sequence”, and of elastic movement in which the axis moves first and transfers energy / impulse to the limbs, which move freely. The principle of movement for an ideal Taekwon-Do technique is that the body parts (hips, shoulders and especially the hand) must reach the moment of impact, each at its maximum velocity and converge with appropriate structure (direction and alignment). The anchorage or connection with the ground upon arrival, and the role played by the Kinetic Energy and the Power in Taekwon-Do blows deserve special considerations that I excuse myself from addressing and reserve for another paper. Here I intend to describe the “how to”, not “why” or “how it works”, which shall have to wait for another opportunity.

The starting point for the analysis of the Wave, with its characteristic up-and-down, has always been Shotokan Karate, which Japanese roots served as the basis from which Taekwon-Do developed. Shotokan was initially explained from a biomechanical perspective by Maestro Masatoshi Nakayama. Thanks to the standardization efforts by the Japan Karate Association, its technique was studied and lab tested, with special focus on the mechanics and power of the lunging reverse punch, called *gyaku zuki*. In such technique the rotation of the hips gives impulse to the rear-placed fist directly to the target.

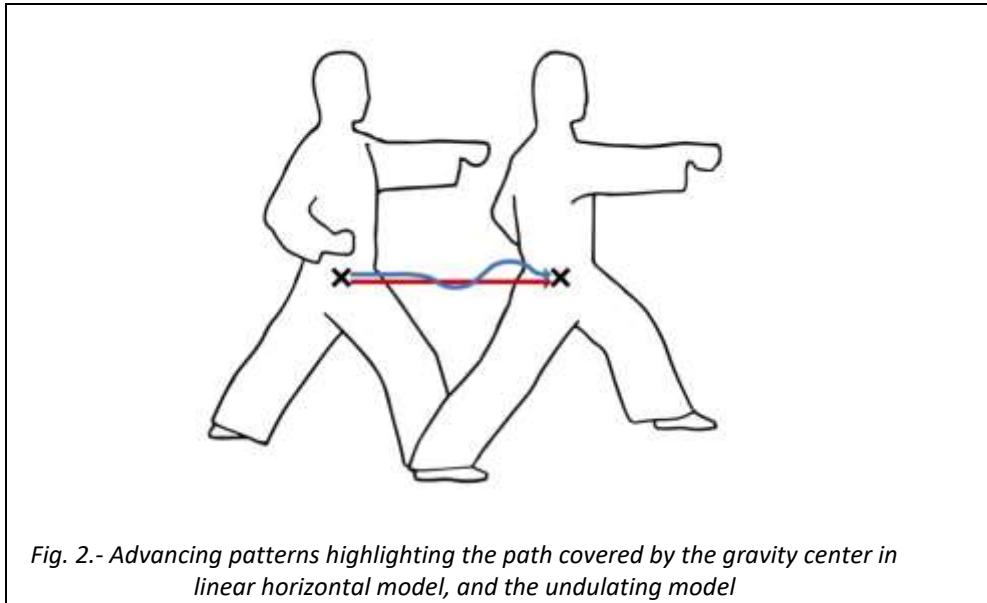


*Fig. 1.- Hip rotation depicted in the book Dynamic Karate by Masatoshi Nakayama.
A famous biblical example is the slingshot used by David against Goliath, the rock expelled on a tangent.
The classical teaching on the direct punch dictates a similar pattern.*

The mechanical analysis published by physics experts on this Karate strike have been extremely accurate and revealing (especially those of Lester Ingber), and have stood for decades, explaining the technique as conceived by the Japanese masters. Among its features, they teach that the hips are to remain low at a constant height during the whole motion. Consequently, the technique is thought of and developed in two dimensions: the width (rotation diameter) and the depth of the thrust.

It is interesting that the Taekwon-Do technique is particularly similar to the Karate thrust, and thus they may be compared. The model proposed by General Choi adds a vertical variable (height) that constitutes the third dimension of physical motions.

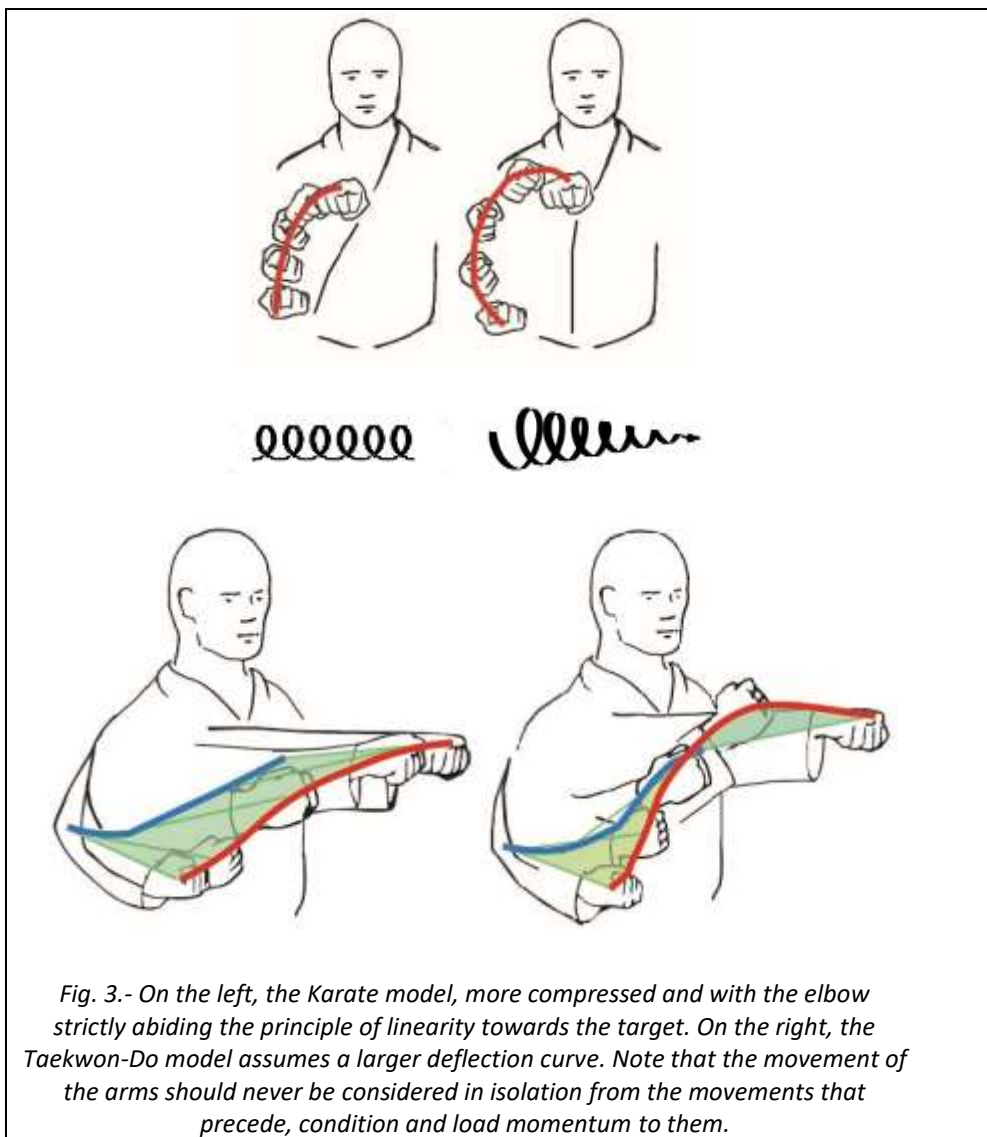
The following figure shows the pattern for a thrusting punch while walking forward in a full step, both with and without using Sine Wave.



Although for simplicity reasons the Sine Wave model has always been showcased in terms of vertical motion, as that is what sets it apart from the preceding Japanese model, the horizontal rotation factor should never be underestimated in the performance of Taekwon-Do techniques. In fact, the combination of those two factors results in a spiral shape that reduces its “diameter” as it approaches the target. Such a spiral, unavoidably three-dimensional, is present both at the economical and discrete Japanese model (evidenced by the corkscrewing rotation of the arm) and General Choi’s Wave model, which is evidenced from the commencement of motion in the overall body dynamics. Other relevant differences are that in Karate’s reverse punch students are instructed (i) to keep the rear heel firmly planted on the ground, with the leg held rigid, (ii) that the fist and arm must rub the ribcage during their corkscrewing path, and (iii) that the fist is clenched tightly. On the contrary, in Taekwon-Do the instructions are (i) that the back leg is gently and naturally bent, although the heel must be planted at the moment of impact, (ii) the rotation of the fist should naturally allow the arm to be released from the body with greater breadth, and (iii) that the fist, and actually the whole body, must travel towards the target effortlessly, deprived of any tensions, which may only exist to the extent necessary upon impact. The hand, elbow, shoulder and hips move loosely as independent yet coordinated parts until they are brought together to make up one single unit when forearms, latissimus dorsi, abdominal muscles and glutes flex milliseconds before contact to undertake the collision. Those differences in perspective are relevant from a conceptual point of view, although at the end of the day and when it comes to the application of techniques by the specialists of both schools the differences will probably be minimal. In fact, the Japanese model is of course also tri-dimensional although more compressed while the Korean is rather expanded. In case of need to hit an opponent in front a trained martial artist at medium / long range, the technique is likely to be rather economical and straight, while if the intention is to smash a block of wooden boards, the movement will probably be wider and with the elbow more open, *vis-à-vis* the Korean style, with the pec muscles playing a greater role in addition to the triceps. This has been suitably described by Brendan Doogan.

In other words, in Karate the thrusting punch is fired from a direct start towards the target, the knuckles rotating on an imaginary axis between the ulna and radius as if it were a bullet running through the narrow

barrel of a rifle. The ITF Taekwon-Do route will be like that of the missiles with thermal sensors that, once fired, describe a spiral trajectory narrowing the turning radius as they approach the target. This means that the turning radius of the movement in the initial and intermediate phases will be wider in Taekwon-Do, allowing the opening of the elbow outwards that when due will be “corrected” inwards by recruiting the pecs. It could be said that Taekwon-Do's fist has a “life of its own” because it is not intended to follow the straight pattern of a bullet shot, but it modifies its path while travelling. The Karate movement model is more faithful to its remote origins of the White Crane Kung Fu, a specialized short distance combat method in which keeping the elbows low is a cardinal principle. Taekwon-Do takes some freedom from that principle, at least in its initial technical approach that focuses on long and medium distances. Both models are useful in their function of making their way through the arms of the opponent. The Taekwon-Do model, however, has a more involving trace which makes it suitable for combining with entering methods (approach to the opponent) as seen in some styles of northern Kung Fu and grappling, in which the elbows open more than in the Japanese model. Imagine a tackling attack and a new idea will show: the lower the line of entrance, the higher the elbows of the attacker.



As a curiosity, it should be noted that in general in most styles of Taekwondo, Tang Su Do and Karate, when it comes to power displays through breaking, the most common techniques are downward strikes (using the fist or knifehand) to destroy piles of bricks, tiles, wooden boards or concrete or ice blocks. In these cases, vis-à-vis such a demanding challenge, the performers do everything necessary to succeed in the breaking test. When it comes to downward punches, in all cases it is seen that the elbow is "released" to the side by clearing the body, although few notice or bring up such technical incorrection. ITF Taekwon-Do is one of the few styles in which power breaks are regularly practiced punching in a horizontal direction, as would happen in case of combat against a standing-up opponent. In general, in ITF style we see little technical value (besides the psychological) in downward breaking. Of course, in horizontal breaks, the elbow is also released, providing the greatest possible power. That is one of the secrets of our blows: the technique of ITF patterns responds to the same model used for breaking.

2. Sine-Wave Mechanic in Forward-stepping Motions

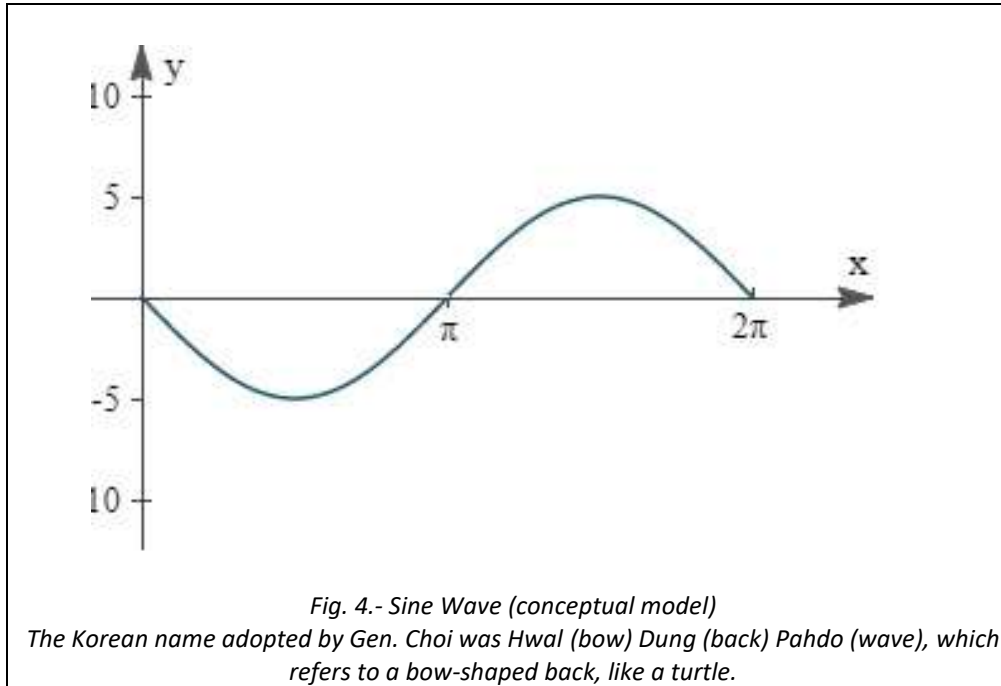
It is now the moment to get into greater detail on the characteristics of the Korean model.

There are those who, like Alex Gillis, consider that Gen. Choi designed the Wave essentially for political purposes, so that the instructors who had left their organization would be marked as oblivious to the evolution and progress of Taekwon-Do. Although I do not dispute the truth of that view, in my opinion this is secondary to the great technical accomplishment that was achieved with the adoption of the Wave as an excellent technical and pedagogical tool. Stuart Anslow argues, on the same line, that while Master Park Jung Tae was the main ITF technical referent in the mid-80s until the early 90s, the Wave was executed with just an ascending and descending phase, a standard which continued until his departure from the federation that allegedly caused General Choi to change his teachings on the Wave.

It is not the object of this work to enter controversy or discuss history, but to analyze the Wave as it is almost unanimously understood by the organizations that today represent ITF Taekwon-Do, which is essentially what I present here, with minimal differences among them. Unfortunately, along with the favorable consequences resulting from its dissemination, practical and interpretation errors have arisen about what the Wave is, which I try to clarify in this work. When someone from outside the "ITF world" criticizes the validity or usefulness of the Wave, it is necessary to see which Wave it refers to, given that several versions or "models" circulate even though only one is supported by the main organizations.

First, it should be clarified that the Wave itself does not generate power, but only contributes to powerful movements due to its fine coordination of actions in adequate time, the use of breathing, the application of body mass, acceleration, impact concentration, etc. The Wave helps all this, but it is not indispensable. The following must simultaneously occur upon impact with maximum final acceleration: exhalation, the foot reaching its destination, the completion of the posture, the culmination of the rotations of the body and the attacking limb, and the technique's symmetrical compensation / reaction (for example, the wrist).

The complete cycle of a Wave is DOWN - UP - DOWN with an identical descent and ascent below and above the horizontal: from level 0 goes down to -5, then goes up to +5, and finally back down to level 0.



The figure above is a conceptual model which for graphic purposes simplifies several forces that converge on the impact, which must be appreciated on the basis of the specific example provided in Figure #6. The drawing above shows, with some exaggeration, the center of gravity of a technique moving from left to right. Note that it is not a representation of the direction of the technique.

To achieve maximum acceleration of the anatomical weapon, the technique must be free of any tension or interference, the idea of "Zero Friction" being a central quality of the Wave, without locked movements. The Wave takes the center of gravity from its resting state (inertia). At the appropriate time, when during the advance the hip has surpassed the base foot, and the support leg is at the point of greatest compression, the "push off" from the ground is activated, in a vertical rebound. A subtle curve results when the upward force combines with the horizontal impulse. For a fraction of a second, that "liberation" of the weight gives a sense of weightlessness when the ascending vertical component is compensated by the force of gravity, and one temporarily feels like floating, as at the beginning of the phase of descent on a roller coaster when initiating the downfall while internal organs are suspended a few fractions of a second. This is what happens with the arms, which are loose. The "fall" phase follows, applying the highest possible proportion of body mass into the target.

Let's focus a second on this data: given that we push ourselves against the ground below us, we start from a vertical component that by means of a natural correction we transform to horizontal. The ascending phase of the Wave is Gen. Choi's way of showing what all human beings do when walking. The only way to propel forward without using a vertical-to-horizontal curve would be to use a starting block as runners do. If we are

going to push ourselves against the ground, it is inevitable to move according to the scheme represented by the Sine Wave.

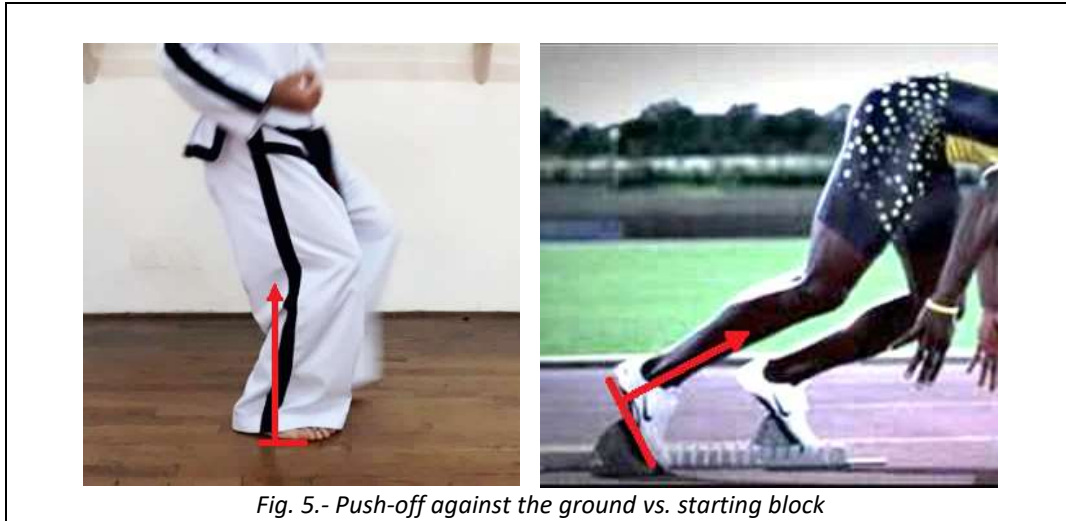
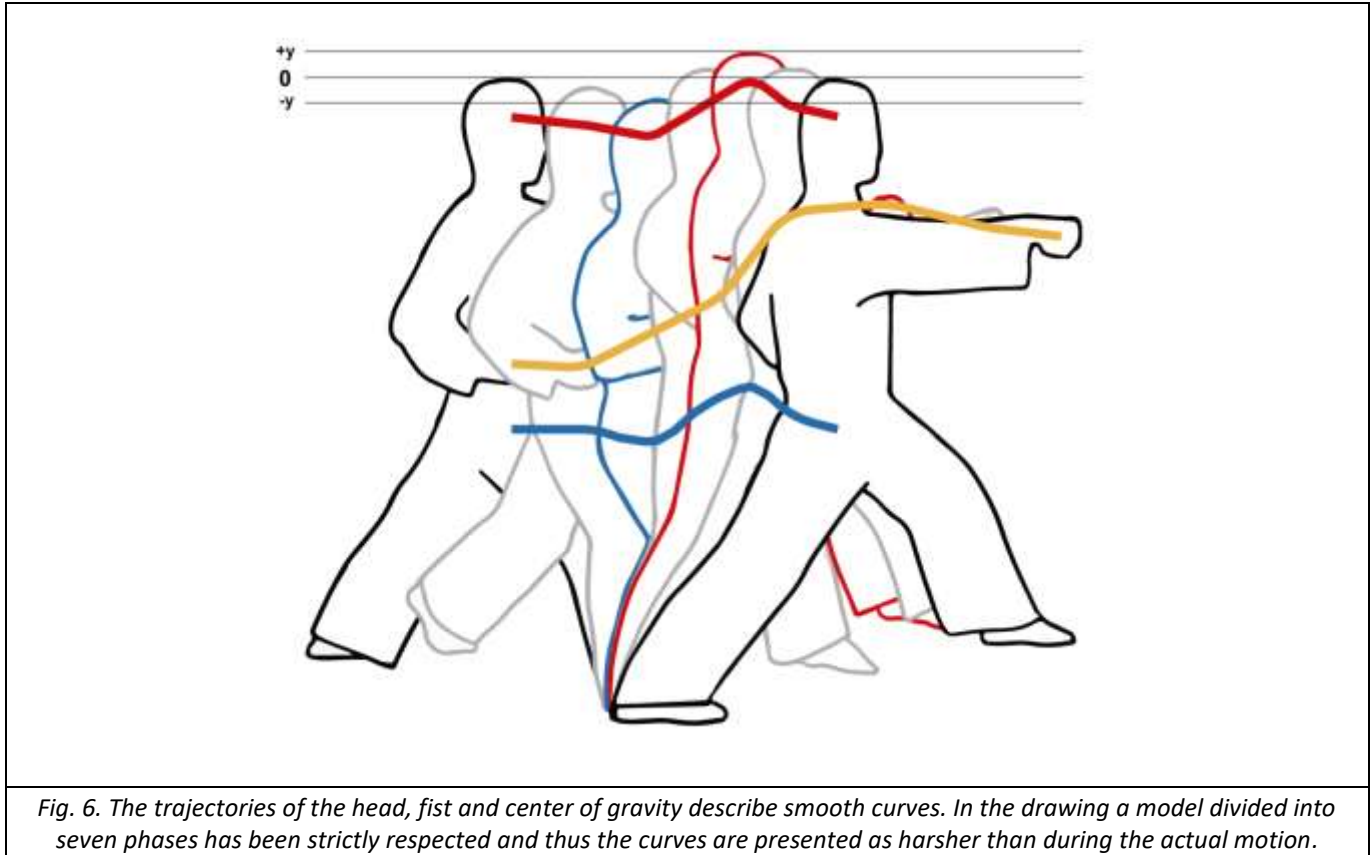


Fig. 5.- Push-off against the ground vs. starting block

In Taekwon-Do the height of the vertical factor between its lowest and highest points (called the “amplitude” of the Wave) must be moderate, considering that the orientation of the techniques we refer to is horizontal (for example, a punch to the chest). In other words, a very sharp rise and fall will not work. As for the final phase, a non-undulating movement, strictly horizontal—like a thrusting punch *oitsuki zenkutsu dachi* in Shotokan Karate or a *bandejirugi apkubi* in Kukki Taekwondo—of course would use speed, breathing, rotation and other factors (as it is also done in the ITF style), but such motion would not take full advantage of the mass transfer when it impacts, as is the case with the slight falling over the target seen in ITF Taekwon-Do. The Wave requires a slow pace of preparation, it is true. Given the “powerful and very fast” versus “very powerful and fast” option, the latter was preferred for the ITF Taekwon-Do forms (usually referred-to as “patterns”). However, this is often misunderstood and exaggerated in its slowness and rising and falling, which transforms it into a pitiful cartoon and deprives it from all value.

In techniques while advancing a complete step when one foot passes next to the other, a slight flexion of the knees is done. Motion decelerates in the middle of the step without stopping (that is when the “descent” happens). The knees act as a spring (“knee spring”), then some slight rebound upwards, descending on the end of the technique to return to the initial level. It is a subtle movement, not exaggerated, executed with ease, which should not affect the advance or retreat, but only activate the use of body mass and promote relaxation.

The arms and legs should be kept slightly bent throughout the movement, without sharp angles. The torso should remain relaxed, and as the movement develops, the arms and legs rotate, accelerate and unwind, taking advantage of the body mass, reaching the intended posture completing the exhalation upon impact.



A purely linear model, as proposed in some martial arts, starting with the “cocked” fist on the hip, would determine when the thrust is shot to chest height, that it describes travels in an ascending oblique plane. With the Wave, the subtle descent of the body and the “revolution” movement of the forearm (a comfortable rotation, less compressed than the one cultivated in Kukki Taekwondo) compensate for that ascending trajectory of the fist, making the blow perhaps paradoxically more horizontal and that makes the most of the body mass. A highly qualified martial artist, looking at Fig. #3 and the open elbow told me that “it would seem that you throw your fist to the chest from a deviated origin ... and then use the Wave to compensate for the initial deviation.” To which I replied that this may be true seen from a linear conception, the same conception that would consider that the rivers go from the mountain to the sea in a deviated way instead of following a straight line. Water seeks the lowest terrain, following the path of least resistance, according to nature (the force of gravity, its density, the terrain, etc.). In ITF Taekwon-Do this “nature”-rule applies: dictated by the shape of human joints, we follow the path of less friction, instead of flexing the latissimus dorsi and looking for a straight line.

ITF Taekwon-Do proposes elastic movements that are remarkably powerful. That is why power breaks have been one of the badges in which Taekwon-Do takes pride since General Choi’s original exhibition tours in the 60s. The elastic characteristic reaches the degree of mandate and implies discarding from the Chang Hon Taekwon-Do those impressive “sharp and snappy” movements that are seen in other styles, with an abrupt end, which can only be executed by young people willing to sacrifice the health of their joints at later stages of life. Our Taekwon-Do is natural and wise; therefore, it can be practiced well into advanced age.

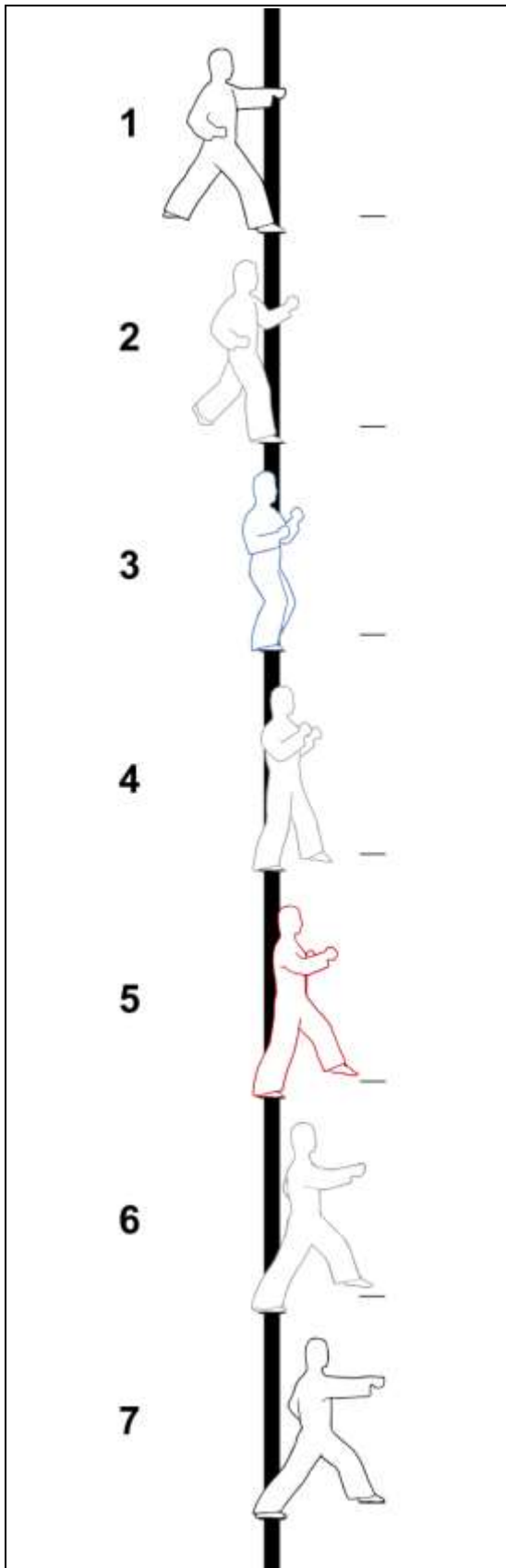


Fig. 7- Advancing Sine Wave (example)

The length of the walking posture (*gunnun sogi*) is similar—although not identical—to that which is naturally adopted when pushing something heavy, aligning the body to issue a horizontal force.

The adoption of short and high positions does not allow the proper unfolding of the Wave, at least by beginners or intermediate students, because the forward or backward movement is limited by the brevity of the posture. The contradiction between the verticality of the position and the horizontality of the technical purpose is something not easily solved at such initial levels. On the other hand, the blows while stepping back pose a real challenge as it becomes impossible to throw oneself against the target. Conceiving a movement model that works unchanged assuring powerful strikes both moving forward and backward is a great merit, and that was possible by conceiving a model in which mass and acceleration are blended in perfect harmony.

Thus, the advantage of the Wave method is particularly evident in forward strikes while moving backwards, which in ITF Taekwon-Do are practiced from the first form (Chon Ji) and demonstrate the validity of its mechanical approach. A relevant point is that the forward leg in the walking stance is more extended than what is seen in the *apkubi* of Kukki Taekwondo, *zenkutsu dachi* of Shotokan or *chongul jase* of Tang Su Do. In ITF Taekwon-Do, the front of the kneecap is aligned vertically with the back of the heel. This "draws" a posture that optimally connects with the earth—iceberg effect—, keeping the center of gravity low, and not using sharp angles that may endanger the structure.

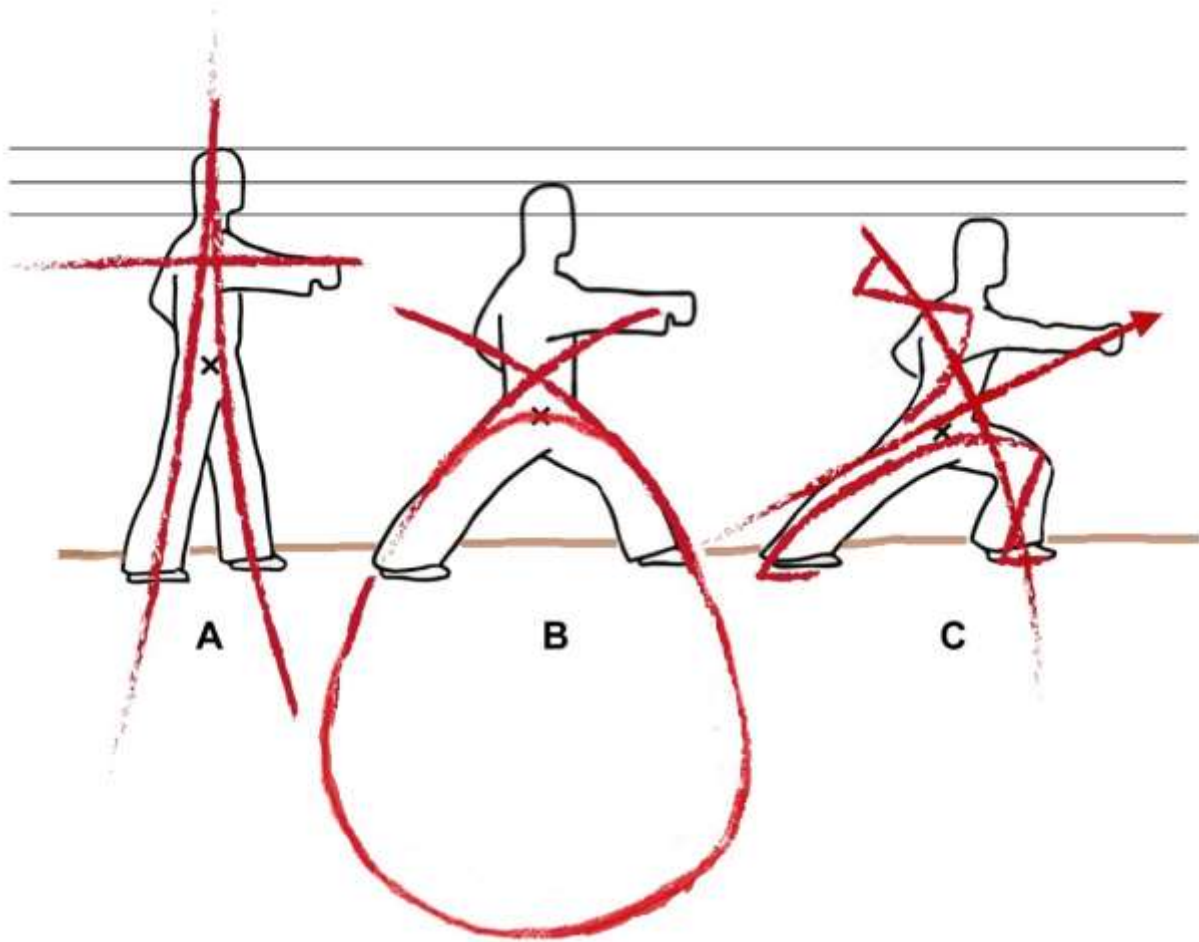


Fig. 8.- Stances from three martial art models compared

Model C shows a long and deep stance (called "Bow and Arrow") probably originated in the training with spears and long staffs that require extended reach with lunges. Its practice develops remarkable strength and flexibility, and the rear leg, hip and slight inclination of the body contribute to transfer power into the movements with weapons. The warriors who practiced such system transferred such excellent matrix of martial education to Jangkwon (chang quan), a method of northern Kung Fu. This served for the descending arts, among them Taekwon-Do and that framework still inspires Korean martial artists because its stringency leads to greater knowledge of the body, its ranges and possibilities. Model B corresponds to ITF Taekwon-Do. It adopts a Rounded Iceberg-type root structure, avoiding acute angles and thus prevents energy leakage through the joints. It seeks the least effort and maximum efficiency, not following the "extreme" training line found in Model C. ITF aspires to an optimal relationship of the center of gravity with the application of horizontal forces forward, backward or in any direction, as well as balancing mobility and solidity. In subsequent generations after Model C (some lines in southern China, Okinawa and even Korea) higher positions have been tested. Usage of Model A demands special positioning skills in relation to the opponent, protection measures against the greater exposure of vulnerable areas, and training other aspects not always present in Taekwon-Do training that would require special consideration.

There are two errors that I observe among my students coming from other styles: the first is to fail to synchronize landing of the foot that advances or recedes exactly when the technique is completed. Planting the foot should never occur before the impact of the technique, if so, all energy shall be discharged on the ground and the blow will be emptied from power. The second mistake is usually made in the reverse punch (not during forms, but when hitting objects or opponents), and consists in raising the back heel, boxing punch-style, as if lifting the heel were the cause of the rotation of the hip. It is a mistake because it prevents

from achieving the appropriate structure necessary for the Taekwon-Do practitioner to serve as connector between the earth and the target. In the walking position—sometimes called forward stance—it is essential that the back heel is planted, because the connection between the ground and the opponent works as an electrical circuit that will not be closed if the heel is lifted. That is the logic of Taekwon-Do postures (and one of the secrets to hitting really hard, even when it is not possible to use momentum); making the reverse punch an equivalent to the boxing cross shows lack of knowledge of this fundamental aspect.

The rhythm and relaxation should be such that the practitioner can perceive the weight of his hands and body when preparing the impact. As for breathing, inhalation should be done through the nose (a specific time is not indicated); upon completion of the movement, the exhalation is short and audible, by mouth, according to Master Nguyen Van Binh preserving approximately 50% of the air in the lungs (North Korean instructors advice that 2/3 of the air should be exhaled). The body should be perfectly aligned, the shoulders low, the back relaxed throughout the entire journey. Head hanging from the sky, suspended, cervical vertebrae separated, feeling light where the knees work as bellows. The arms are the extension of loose movements originated in the shoulder and pelvic (hip) girdles. There should not be a special rotation of the hip or shoulders, but that does not mean that they should remain locked or rigidly held towards the front: they should move and naturally accompany the movement. The fact that the spine connects both girdles vertically should not lead us to the mistake of thinking that the hip is restricted to move only as if it were a horizontal disc. The hip offers movements of anteversion and retroversion, and the vertebrae articulate flexibly, as do the knees, expanding the motion possibilities. It is more useful to conceive the center of the hip as a three-dimensional sphere, not as a disk, and consequently the forces initiated there may be appreciated from a different place than usually offered in martial arts studies. Unless we abandon the habit of thinking about "planes", we cannot access the paradigm that has been opened by General Choi's proposal. Each of the joints usually ignored in Taekwon-Do because of their "minor" significance (vertebrae, shoulder blades, shoulders, clavicles, chest, etc.) are part of the wave's sequential chain and serve to transmit, through muscles and connective tissue, the whip of energy that makes up the blow. Hence the importance of joint mobility and flexibility of the torso. It is inconsistent to proclaim the Wave (which is three-dimensional, highly flexible, with spherical and helical aspects) and conceive the body as a collection of a few articulated rigid parts as if it were a 20th century G.I. Joe action figure. The "advanced" conception of the movements taught by Gen. Choi needs a vision of the human body that recognizes it as flexible and integrated, as the Alexander Technique or the Feldenkrais Method propose, according to the traditional Asian martial arts conception. This is the profound reason why at advanced levels a particularly strong and flexible body is required, which functions as a whip, not as a nunchaku. That type of exercise in turn works deeply on the fascia and provides a natural massage that contributes to the practitioner's health. For all this, addressing the study of the Wave requires expanding our vision of the human body.

3. The Wave with a different Shape: Fibonacci for Techniques on the Same Spot

So far, I analyzed the Sine Wave during forward stepping techniques as presented in the first patterns. Now it is appropriate to address how the undulating movement is executed when performing a technique remaining in the same place. We will take as a sample the first two movements of Do San, the third pattern of ITF Taekwon-Do. Here it should be noted that exaggerating the undulation serves as an exercise of self-perception in training, but it should be avoided in the usual execution of the forms. Just as it is a frequent mistake to overplay the ascent and descent, another error that is observed—especially in the chaining of successive techniques in the same place at walking stance—is to oscillate back and forth the head and torso, instead of keeping them in place. This error not only violates the principle of economy that dictates

avoiding any unnecessary movement, but frequently determines that the practitioner oddly takes the body back when striking forward, subtracting mass and power from the technique (for example, in the transition to 2nd technique of Do San). Below is a representation showing the correct way to use the Wave in that type of technical linking. As it is obvious, the absence of forward-stepping determines a different shape, technically not that of a sine wave. As the diagram shows, its path follows a forward downward curve, backward reflux, ascent and then descent, like a spiral that unwinds.

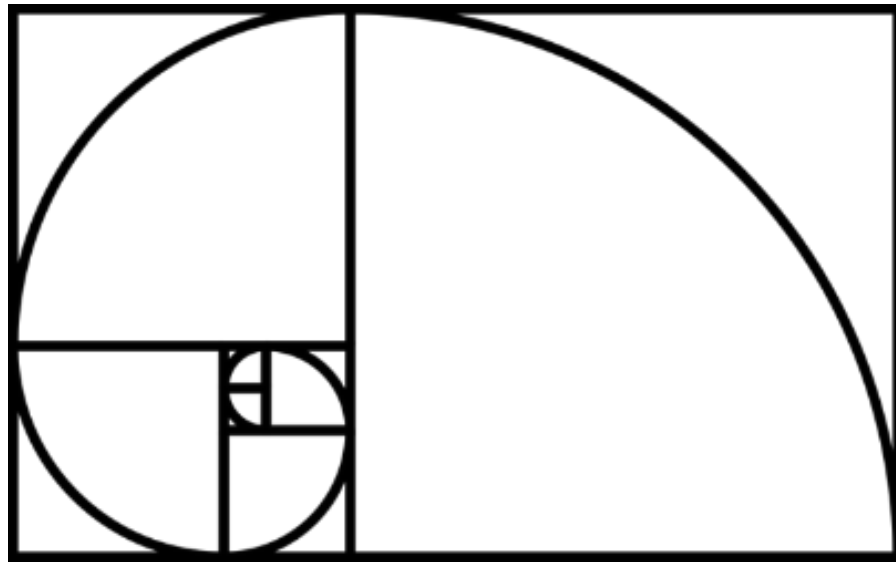
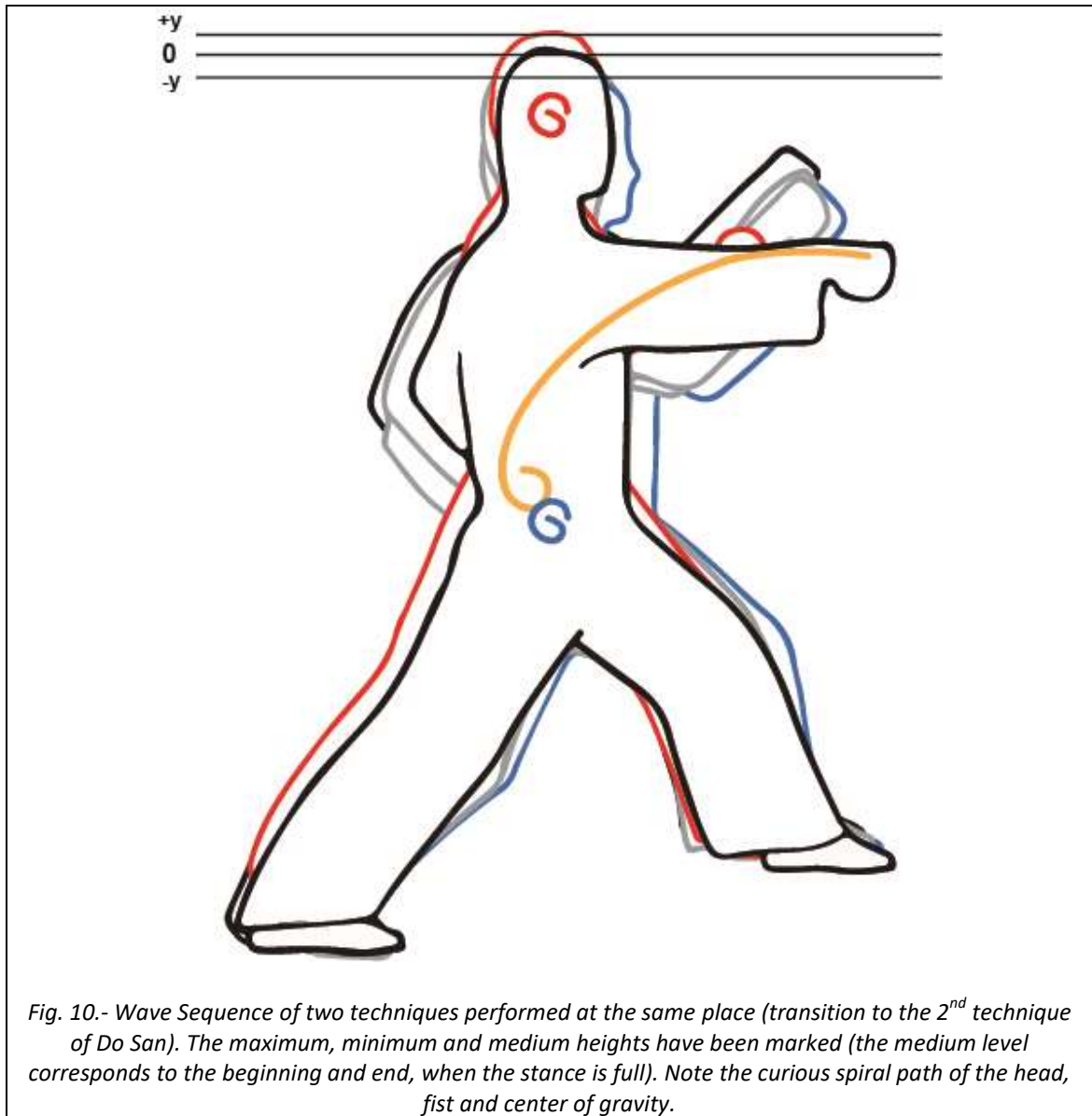


Fig. 9.- The curve to the non-stepping Wave seen from the side has many of the features of the Fibonacci spiral, a logarithmic pattern observed in Nature called the "Divine Proportion" or "Golden Ratio". It is not very difficult to imagine how it may apply to the reverse punch seen sideways, as it may be further observed in the following figures. However, the three-dimensional / helical factor must always be taken into account: seen from the front, a Taekwon-Do thrust with the right fist shall converge in a clockwise spiral as shown in Fig. #3.

The interesting thing about the Fibonacci model is that it illustrates a fundamental principle of Taekwon-Do techniques: they entail an uninterrupted, seamless succession of winding and unwinding motions.



The following graphic (Fig. #11) illustrates the same technique along seven phases in great detail. The progression is shown at the left column, highlighting the maximum (red), minimum (blue) and average (black) heights. It is very important to understand the “explosion” from the center-of-gravity both forwards and backwards that occurs from the 6th to the 7th phase as shown by the arrows. The head remains essentially in the same place. The next column highlights the play of the knees, ankles, back heel and hip. The right column of the Figure shows how the initial position is slightly profiled, in a triangular blocking structure, so that the right hip is subtly held back, unlike what will happen at the end of the sequence, with the chest fully front-facing, achieving another type of alignment for the impact of the direct thrusting reverse punch. Note that the focus of the blow is behind the impact surface, as revealed by the isosceles triangle that forms with the shoulders. The Fibonacci spiral in the third column is a representation of the general motion from a side view and depicting the general sense of movement (forward / downward, backward, elevation to the maximum point, and again downward / forward with a very subtle advance of the right hip with download).

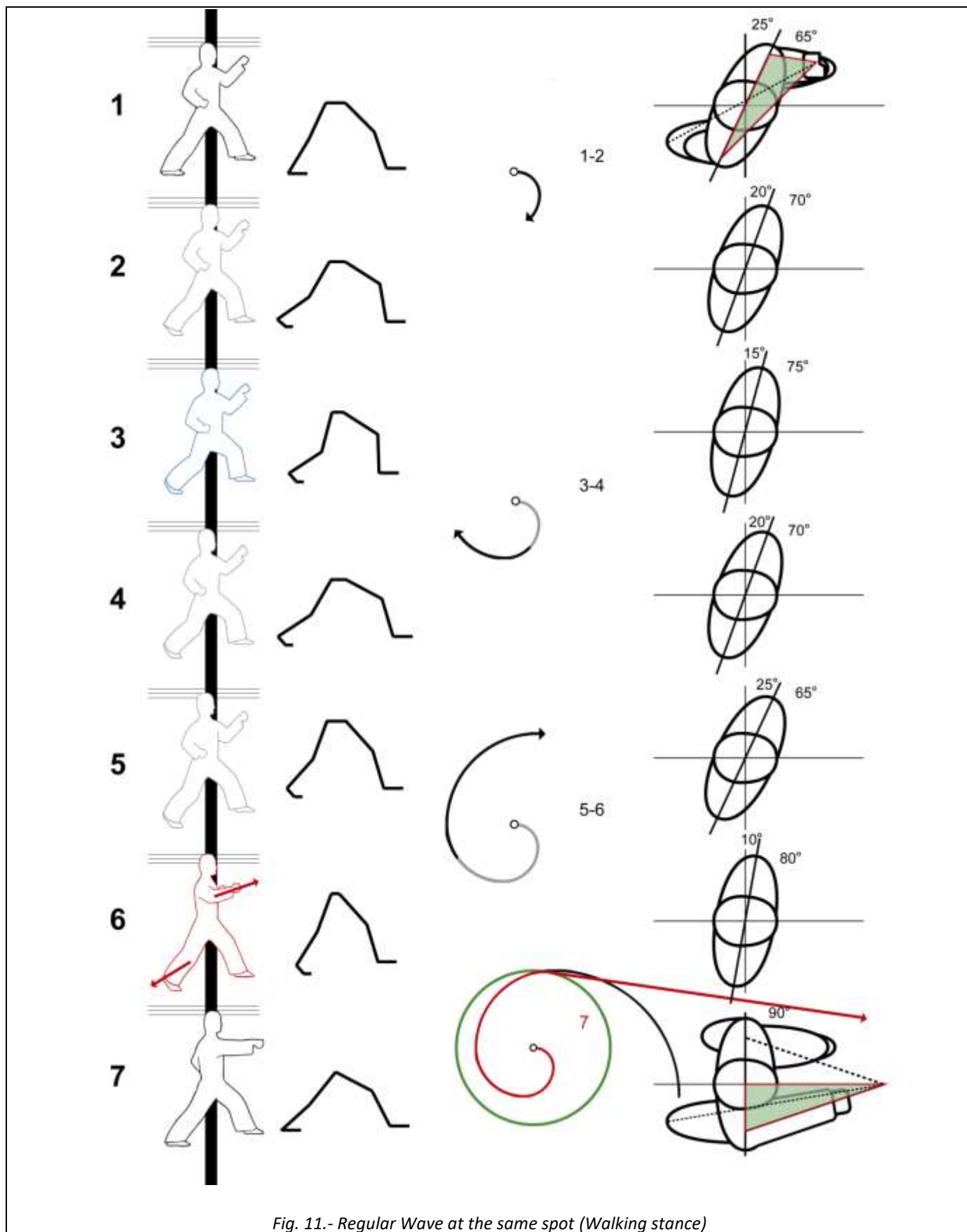


Fig. 11.- Regular Wave at the same spot (Walking stance)



Fig. 12 – Illustration of the relationship between the Fibonacci spiral and the tangent model. Probably any differences are resolved in a 3D model, since the movements must be conceived from the spherical. Note that according to the Um-Yang conception, from the axis forces of equal direction and intensity are triggered in the opposite directions, as illustrated in phase 6 of the previous graph. In such technique, the fist contacts the target at the same time the heel connects with the ground. That circuit logic is one central aspect of the striking model of Asian Martial Arts.

I should point out that Figures #6, #7, #10 and #11 are somewhat extreme samples—that is, with the maximum “breadth” that in my opinion is tolerable—of the Wave in Taekwon-Do. Ideally, once this technical resource is mastered and incorporated, it should be reduced and made invisible to external observers. Actually, when stepping forward there is no need to lift the advancing foot off the ground and it should be avoided. At more advanced levels, circles and rotations occur within the body in a very subtle way (ergo, in a strike on the same spot, the head should not move up or down). Taekwon-Do demands a strong, effective and natural style of execution. Those who execute exuberantly “wavy” movements to be counted among those “loyal to ITF” are confused, since their “bombastic” wave shall become a hindrance to progress to levels higher than those usually seen at ITF Taekwon-Do. However, federations insist on pompous Waves because it is considered a legacy of General Choi, and a teaching resource for those at initial stages. Consequently, black belts are not encouraged to aspire to the greatest possible martial arts level, but to conform and perpetuate the “official pattern”.

In Taekwon-Do, among the central factors to achieve a powerful impact are 1) the concentration in a reduced surface area that should make contact with the target, 2) application of body mass, 3) maximum acceleration of the anatomical tool upon impact, and 4) assembly of the structure / posture that allows to use the firmness of the ground by arranging it against the opponent. This structure is correctly established when, for example, both heels are in contact with the ground, with body segments properly aligned according to the trajectory and impact angle on the target. This structure is applied using postures, something proper to the family of martial arts derived from Shaolin (i.e., Kung Fu, Karate, Tang Soo Do, Taekwon-Do, etc.) that is not seen, for example, in Western boxing. Of course, it is not always possible to use all these factors fully, and there are others to consider: sometimes the situation requires a quick strike at the expense of power (speed is not the same as acceleration); sometimes a blow aimed at a weak target makes it unnecessary to apply power; jumping kicks and strikes do not benefit from contact with the ground, although in absence of rootedness, the alignment requisite still applies. The amount of possibilities

for strikes cannot be reduced to a single type; in fact, the three-part classification by Gen. Choi of attack types into linear impact (*jirugi*), blows (*terigi*) and lacerating / penetrating (*tulgi*) does not deny the existence of other types (for example, slashing with the fingernails is also found in the ITF Taekwon-Do Tul). On the other hand, in Taekwon-Do it is assumed in principle that the target to impact is resistant—bones, wood, bricks. Keep in mind that the fame of the ancient martial arts of northern China and Korea—*Shobuo* or *Subak*—was that their experts could "break the bones" of their opponents. This fondness on breaking hard objects does not prevent us from considering that 70% of the human body is water, and that an impact wave has particular effects within the human body depending on how it is hit (an issue that is especially studied in Systema). All issues that, due to their complexity, cannot be systematized in Taekwon-Do for the general public, although they do deserve to be studied to pierce the roof of the knowledge reached so far. The fact that the four factors mentioned (concentration, mass, acceleration and structure) do not exhaust all facets in the field of strikes does not invalidate the sound criteria embodied in ITF patterns. The main focus of these is the development of striking power, from a holistic vision that proposes a mechanic that with minimal adjustments is also suitable for pushing, dodging, deflecting, knocking down, releasing from grabs, etc., following the line of classical martial arts.

The concept of the Wave is not exclusive to ITF Taekwon-Do. With different names and points of emphasis it is found in martial arts such as Taekkyon, Xingyiquan, Taijiquan, Baguazhang. These last three are remarkable Kung Fu styles that make the act of walking and the channeling of energy through the body an art in itself. The introduction of the Wave in Taekwon-Do by Gen. Choi, with a precise formulation, has been instrumental in making thousands of practitioners around the world understand how the power generation mechanism works, the quality of movement, relaxation, and other issues that lead it to be a high-level martial art. The detail in the "transitions", that is to say, the possibilities and combative applications of what happens in the phase in which the feet are coming together, are subject of advanced study (the "internal Taekwon-Do"), and have not been received enough attention in Taekwon-Do, apart from exceptional cases such as Sanko Lewis' publications. The Connected Motion, which is described below, is just a minimal sample of that aspect.

I indulge myself here with a digression on the "old" wave model, which was usual in ITF Taekwon-Do by the end of the 80s and was then discarded by Gen. Choi, as it is properly described by my friend Stuart Anslow. In that version, the taekwondo-in "jumps" from the beginning to the end by drawing a parabola without bending the knees at the intermediate point, which makes the practitioner virtually airborne in that phase in a relatively unstable and vulnerable situation. The fact that the photographs of the Encyclopedia of Taekwon-Do (the great work of Gen. Choi) of the late 90's do not show the immediate phase prior to the elevation may have led to confusion, although to clear any doubt we have the Legacy series video footage endorsed by Gen. Choi himself. The habit of rising from a low posture without first approaching the feet in flexion is the opposite of what is needed in close quarter combat, and that is why in traditional martial arts when the feet are close the knees are slightly bent. Since the Wave is a pedagogical resource for incorporating combatively efficient movement habits, it seems that the "old" wave should be discarded. The Wave (the "official" version, described here) represents to some extent a return to the sources, as it resembles the Shotokan model in the compression of the knees and ankles down in the intermediate phase, prior to a subtle release or ascending rebound. In any case, these differences in approach are probably minimal in their practical consequences and discussing them should probably be considered a vain hobby among specialists.

4. A View on which is the Highest Virtue of ITF Taekwon-Do Patterns

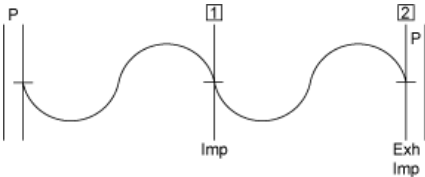
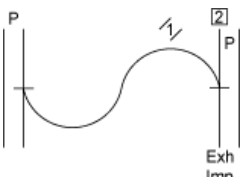
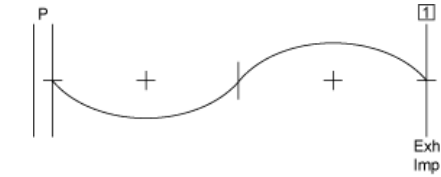
Having analyzed the way in which the Wave should be executed as an ITF Taekwon-Do tool, I understand that it is important to stop and take a wider look at the Tul from a more general perspective within Taekwon-Do. Some Taekwon-Do scholars pay special attention to the combative applications of the Tul, and are dedicated to rescuing or identifying the most plausible uses of forms for self-defense. Stuart Anslow stands out among them, who has written excellent books on the subject exploring that area of Chang Hon Taekwon-Do as nobody else has. For many years, that was a special concern in my practice. From the psychological point of view, for the "programming" of the unconscious of the practitioner seeking to incorporate appropriate responses, obviously it is very different to execute movements as mere exercise, or to train with the mental disposition that experiences motions as fighting maneuvers. Intent and imagination play a fundamental role in training, that are often overlooked. In addition, an adequate familiarity in the precise practice of grips, levers and throws—domain par excellence of Hapkido and Judo / Jujitsu—allow to identify when these techniques are “hidden” in the forms and gives Tul training a more rewarding dimension. All this was part of my martial education, and I hope it is also that of my students. Knowing applications of the forms seems necessary to me, although I do not believe that it is the central theme as far as the ITF Taekwon-Do forms are concerned (I think the same about other "styles" of Taekwondo). In other words, there are two aspects that complement each other: the "combative maneuvers" against Habitual Acts of Physical Violence—using the terminology of Sensei Patrick Mc Carthy—and the appropriate motor habits for maximum power strikes. The first, in my opinion, should be practiced with an actual opponent. Originally, the Chinese and Okinawan karate forms contained these maneuvers performed exactly in the manner they were to be carried out in self-defense. With the passage of time, generations added layers of ignorance and creativity which led the forms towards an “evolution” that ended giving new meanings to their new movements. In my opinion, today the maneuvers found in the ITF Taekwon-Do forms (and in Shotokan and Tang Su Do) are useful and applicable to personal protection (Stuart Anslow's books are testimony to this), but judging them as combative maneuvers, I consider them suboptimal. They are quite good—when they are carried out by a trained black belt—but they do not lead to perfection. In this I adhere to the criteria of the great martial art theorist Steven Pearlman who proposes a series of principles ordered by priority that allows to measure the comparative value of martial movements and thus not only conceive the best alternatives for each situation, but most importantly to have a defined, rational criteria towards the martial perfect. If perfection is not a place we can see (yet), at least there is a direction towards it on which we can walk. In my opinion, the greatest return on the investment of practicing Taekwon-Do patterns resides on learning how to move the body. Taekwon-Do patterns focus on building power structures and perfecting the discharge of blows, a "Yang" conception with its mind essentially on collision scenarios. The skill of taking advantage of the force exerted by an opponent and the possibilities of "no form"—what is known as the "Um" approach—have received little attention in the Tul. Their extraordinary value is not in the *maneuvers*, but in that the Taekwon-Do Tul are not only a remarkable and vast compendium of *techniques* (combative gestures shorter and simpler than the maneuvers, with formally established application) but especially a resource for internalization through its repetition of natural, plurivalent and adequate motor habits. Until the first levels of black belt (the Yang stage), the main objective is to incorporate “power positions”, solid defense and attack structures moving decisively in different directions, unleashing movements with power, balance and grace. At a more advanced level (the Um stage), preparations, crossings and transitions—their mechanics and possibilities—become decisive. I have observed the dissemination of conceptual errors in some technical gestures that make it impossible for the movements to be neuromotor- programmable for use in self-defense. In other words, it is possible that a punch in one form performed in a certain manner is powerful, but that for the sake of that power certain details are being sacrificed that kill the "naturalness" of the motion. Precisely "naturalness" is what allows that a

movement, being in line with the physical and psychic conformation of the human being, can be assimilated and used instinctively when needed. Therefore, I insist that precision is essential in certain movement parameters, which have nothing to do with standardizations or aesthetic concerns. The grace and precision of the movement are attributes that should not be neglected if it is being practiced in search of its applicability. It is known that during extremely stressful situations the body enters into a state in which certain anatomical functions are relegated, such as fine motor skills. Zen (Son in Korean) meditation in martial arts, among other objectives, seeks to attain a calm state in extreme situations, to maintain such a psychophysical balance in which the martial artist reacts “like a mirror” (apathetically returning the image to what is presented in front of us), devoid of ego and unrestricted by the shock of adrenaline, or by our own fears or even thoughts. The reduction of fine motor skills determines that combat movements must be natural, simple, consistent, unaffected. There is no room for embellishments. The hands or feet will just continue with the motion idea initiated and communicated from the center. On this area, I recommend the writings of Dan Djurdjevic. The only details that must be looked at in the patterns are those that allow us to eliminate tensions, contrivances or predetermined ideas. In forms (and in the martial arts in general), it is not about adding but about stripping. The institutional and the sportive, when they exceed their place, threaten martial art technique because they add unnecessary stylistic rules and anything exceeding the indispensable is potentially harmful. My opinion is that the Taekwon-Do Tul are studies on combative biomechanics initiated from Shotokan Karate and later enriched with additional parameters, adopting the scale of preferences of General Choi and the Taekwon-Do Pioneers. ITF Taekwon-Do forms display an innovative and particular technical personality, while respecting the essential principles of movement that are found in martial traditions proven over several centuries. The historical roots of Chang Hon Taekwon-Do, the limits of the knowledge of its pioneers at that time, and the preferences and vision of General Choi determined the current Tul. If during the formative stage of Taekwon-Do the focus had been on rapid striking combinations, quick displacements, special attention on weak targets, or the particular development of certain physical qualities, instead of concentrating on power and naturalness, then the Tul and Taekwon-Do itself would be very different than what it has become. To understand a martial art system is to understand its training ideas, and the path of growth it offers.

5. The Five Basic Motions in Taekwon-Do Tul

Let us now return to the Wave, and how it is presented in the patterns. Although Taekwon-Do is not limited to the techniques and methods contained in the patterns ("Tul"), I am convinced that the ITF Tul are a sure guide to progress. They must be executed in the way they were conceived by their creator, Gen. Choi. The patterns contain different variations of the Wave, with difference in time, intensity and mode of chaining which must be distinguished and respected. They are proof of the vast array of possibilities of the Wave. Among the different ways of executing the movements, the Encyclopedia lists *Five Basic Motions* found in the Tul whose explanation is described in the following table.

The Tul also include other types of movement / motions in addition to the main five. Among them are sliding (*mikulgi* (example in movement # 25 of Hwa Rang), short adjustment shifts (*jajunbal omkyo didigi*), stomps (*cha bapgi* - “stamping”), different types of step (*omkyo didigi*), changes of direction (*dolgi*) and jumps (*twigi*). It should always be borne in mind that Gen. Choi taught that during the Tul, techniques must be executed *with realism*, which requires the movements to be strong.

1.NORMAL MOTION: <i>It is the usual way to move in ITF Taekwon-Do Tul, the normal Sine Wave. Each movement is executed at normal speed with a complete undulation (down-up-down) and a single exhalation. It is found in all movements at the four-direction sets (saju jirugi and saju makgi) and in Chon Ji Tul. Immediately after reaching its maximum extension, given the elastic nature of the movement, a minimum setback of the technique is observed, without any rigidity, and a pause must be observed before commencing the next movement. One complete breathing cycle per movement / technique with a complete wave.</i>	 <i>There is a descent and an ascent, returning to level with exhalation upon impact. "P" indicates the previous and subsequent pause.</i>
2.CONTINUOUS MOTION (<i>yonson dongjak</i>): <i>It is a way of linking two or more techniques. It is introduced in Dan-Gun Tul (movements 13 and 14). Two movements are performed consecutively with two complete undulations (down-up-down in each technique) with one inhalation and two continuous exhalations (or, a different way of portraying it, two peaks of the same exhalation). The two (or more) movements must be linked without pause between them, but without haste, striving to attain beauty through continuity. When more than two movements in continuous motion are developed, only 1/2 wave (from level 0 up / down to level 0) must be executed. This happens for example in Po Eun Tul movements 6 to 12 and 24 to 30 or in Yoo Sin Tul in movements 16 to 19. There are two techniques and two exhalations without pause or intermediate inhalation.</i>	 <i>There are two impact movements each with normal wave continued without pause, the exhalation finishes with the 2nd technique.</i>
3.FAST MOTION (<i>barun dongjak</i>): <i>It is a way of linking two techniques in rapid succession. It is introduced in Do-San Tul (movements 15-16 and 19-20). Two movements are developed consecutively in fast speed. Not only is the execution of each technique faster, but the time between them is very short. The first technique has a full wave (down-up-down to level), and the second is half wave (up and down to level) with exhalation and adoption of the final stance. For two fast-moving straight punches are performed walking forward, there are those who claim that on the first blow the back leg must be flexed and the back heel off the ground, against which GM Rhee Ki Ha says the heel should be kept on the ground (although the knee may have some flexion). That is consistent with the 1993 Edition of the Encyclopedia. At the end of the second technique, the back leg must be fully extended, and the foot planted. Some people state that the fast motion of the 2nd technique is 2/3 of a normal sine wave because it is not down-up-down but just up-down. However, the graphic shows clearly that it is only one half, because the start is at 0 level, and not lower. There are two techniques—the second with half wave—and two exhalations.</i>	 <i>The example is the combination of two successive direct punches. The first corresponds to a normal wave, but the second omits the preparatory descent phase (goes from "zero level" upwards) because it is a quick combination.</i>
4.CONNECTING MOTION (<i>uijin dongjak</i>): <i>It is a way of linking a soft technique (deviation, absorption, hooking or trapping) with a striking technique. It is introduced in Yul-Gok Tul (movements 16-17 and 19-20). The two movements—in that case, the second defense (in the picture, /1/) and the punch in the picture, 2)—are executed in a single wave and a single breath. The first movement (which is the second hooking block, down-up) is completed in the "up" position of the wave and the punch in the final "down" position (down to level). Although some state that the last technique uses 1/3 of a sine wave, the graph shows it uses ¼ as after the defense the punching motion only descends. The "soft" technique must lack any tension in the hand or tool being used, deflecting an attack without interrupting the course or disposition of the opponent. The techniques blend in a single body gesture connected in one Wave, with a single exhalation.</i>	 <i>The 1st (a soft) technique is executed in the "peak" of the ascent, without impact and without cutting the exhalation, which continues until the 2nd (an impact) technique is completed.</i>
5.SLOW MOTION (<i>nurin dongjak</i>): <i>It is a way to train for awareness of the wave mechanics. It is introduced in Joong Gun Tul (movements 27, 29 and 30). It is a movement that is executed slowly with an undulation, taking twice the time (some teach three or four times slower) taken by a normal movement, with very slight acceleration over the end. It corresponds to a normal wave, but it is done with the slowness that allows the practitioner to be especially conscious of the simultaneous arrival of foot, hand, breath and sight. One wave, one breath per technique, double the time.</i>	 <i>It is crucial that all rotations are completed at once (hands, torso, hips).</i>

The following chart provides a reference to identify the different motions in each Tul.

		TUL	Continuous Motion	Fast Motion	Connecting Motion	Slow Motion	Stamping	Sliding	Shifting
9° gup	1.	Chon Ji							
8° gup	2.	Dan Gun	13-14						
7° gup	3.	Do San		15-16 and 19-20					
6° gup	4.	Won Hyo							
5° gup	5.	Yul Gok		2-3, 5-6, 9-10 and 13-14	16-17 and 19-20				
4° gup	6.	Joong Gun		15-16 and 18-19		27, 29 and 30			
3° gup	7.	Toi Gye	7-8			3, 6 and 12	13, 14, 15, 16, 17 and 18		
2° gup	8.	Hwa Rang		18-19				6 and 25	
1° gup	9.	Choong Moo		14-15					
1° Dan	10.	Kwang Gae				2, 3, 10, 11, 21, 22, 26 and 30	31, 32, 36	5 and 7	25 and 29
	11.	Po Eun	6 to 12 and 24 to 30			15 and 33			
	12.	Ge Baek	5-6 and 37-38	3-4, 22-23	9-10 and 29-30		39 and 40		
2° Dan	13.	Eui Am	5-6 and 18-19			13 and 26	10 and 23		
	14.	Choong Jang		46-47		3 and 28	29, 31, 33 and 35	9 and 21	
	15.	Juche	2-3 and 14-15			5, 17, 26 and 40	8, 20, 41	27, 29, 33, 35 and 39	
3° Dan	16.	Sam Il	30-31				22, 27, 33	1	
	17.	Yoo Sin	4-5, 6-7, 16 to 19, 20-21 and 25-26	2-3, 34-35 and 36-37	10-11 and 14-15	45 and 48	41, 42, 51	2, 3	
	18.	Choi Yong	32-33 and 39-40	21-22			38 and 45	29, 46	
4° Dan	19.	Yon Gae	10-11 and 21-22			2 and 13	39 and 42	1, 3, 12, 14, 47, 49	5, 16, 40
	20.	Ul Ji	2-3	11				33	
	21.	Moon Moo			28-29 and 37-38	1, 2, 5, 9, 10, 11, 14, 18, 20 y 23		28, 34, 37	45 and 48
5° Dan	22.	So San	52-53, 57-58 and 71-72	5-6, 7-8, 39-40 and 47-48				1, 3, 23, 25, 50, 55, 60 and 66	31, 33, 61 and 67
	23.	Se Jong				15 and 20			
6° Dan	24.	Tong Il		5-6, 14-15 and 20-21		1, 2, 11, 12, 13, 24 and 25	17, 19 and 38	29, 33, 42 and 44	

This chart is based on the English language edition of Gral. Choi's 1991 Edition of the Condensed Encyclopedia, and the 3rd (1993) Edition of the 15-volume Encyclopedia in English adjusted by other sources. The additions of the later versions have been included, but I have consulted different sources (not successive editions of the same source). In case of discrepancies in special motions, I have treated the latter as omissions instead of considering them purposeful deletions. There exist several opinions among groups which determine variations in the patterns. This is just a reference chart that I share, without claiming it to be more valid than other groups.

6. Taekwon-Do, an Art under Construction



The final pattern of ITF Taekwon-Do is Tong Il, which means Unification. General Choi considered himself a Korean patriot, and his dream was the unification of his homeland. Gen. Choi was a man with a focus on history on many levels, as he expected and considered natural for Taekwon-Do to continue improving after his death. The left-side picture is the ready stance for Hwarang Tul (the first pattern he designed in 1955), which is considered a proper, natural martial art posture. Tong Il junbi stance is shown at the right. There are two irregular features in that stance that represent the divided, unnatural situation of Korea during Gen. Choi's lifetime that remains to this day. The first oddity is that the hands are clasped together while the feet are spread apart, showing an improper relationship between the upper and lower part of the body. An image comes to mind with the closed North Korea, and the open South. The second is that while in all other Taekwon-Do patterns' preparatory stances the left hand is presented to others as a symbol of courtesy, Tong Il rudely displays an intimidating right hand which under normal circumstances is kept concealed. General Choi was adamant about toughening his own right fist on a daily basis, and he used to say he saved his left hand for delicate affairs. So the symbol has also a personal connotation that cannot be overlooked. The ITF Taekwon-Do founder hoped that the Korean division is overcome some day, and maybe at such time his heirs will be able to obtain for Taekwon-Do the harmony absent in its last pattern.