

# **The parallels between the principles & Theory of Power in Tae-Kwon Do, and interpretation in geoscience**

**by**

**Brett Davies *PhD* (III Dan)**



*Thesis in partial fulfillment of the requirements for promotion to IV Dan*

## **Introduction**

The components of Tae-Kwon Do, including the theory of power, training secrets and philosophy represent a description and application of the knowledge and help to define the processes aimed at maximizing the effectiveness of each motion, whether is simply a change in stance, an attack motion, or a defense motion. If an understanding of these processes or an appreciation of the implications this poor understanding translates into, then there is a consequent decrease in the effectiveness of the motion.

In a similar way, Earth processes follow a wide range of physical rules that govern material behavior. Like Tae-Kwon Do these are complex and inter-related so the approach to understanding them and to interpret what we observe around us has to be the same. This author is a geologist who has worked in many parts of the world and who is involved in the interpretation of the history of parts of the Earth for around 25 years. There are many lessons that can be learned from Tae-Kwon Do that help in this work. Conversely, the similarities in approach and the required discipline in the interpretative process reinforce the importance of following the principles that govern the practice of Tae-Kwon Do, especially understanding the Theory of Power and the following the Training Secrets..

This thesis illustrates and compares the similarities between the principles of Tae-Kwon Do and development of effective technique and the approaches and methodologies applied to interpretation in geoscience.

## **Background**

Maximizing power, or energy, and releasing this at a point in a single instant requires a combination of appropriately coordinated physical and mental effort. The action is necessarily a flowing one, driven from a base (the ground or floor), through the body via the large muscles to the smaller muscles and outwards beyond the point of impact. As the skeletal geometry and musculature can vary between individuals, the methodologies used by those individuals to achieve flow, balance and power also vary. Emphasis on particular aspects of technique may vary somewhat between these people, but despite this the principles always need to apply. It is a matter of achieving a 'balance' that accommodates the physical differences each person is partly defined by and the need to acknowledge the physics that underpins Tae-Kwon Do practice.

In Tae-Kwon Do the physical variability between individuals is manifested as subtle, though distinct, differences in the execution of fundamental motions. However, their effectiveness and their contribution to the completion of a perfectly executed pattern will *only* occur if the principles have been applied correctly and the training secrets have been understood. The focus on a particular component, such as a punch, without due regard to weight transfer and reaction force for example, will result in a poorly integrated action with a less than optimum outcome. These apply to blocks and attacking motions equally. Similarly, the absence of body 'centering' i.e. the transfer through a critical neutral point between positions, a point at which the whole body is for a fraction of a second totally balanced and relaxed, will result in a loss of flow and ultimately a reduction in power for attacking or blocking motions. Effectiveness decreases even further if other components are not present or coordinated; these include correct stances, breath control, speed, focus, equilibrium, sine wave motion, correct angles and distances. In practice this is often observed in students as a 'falling' through action with no clear resolution of specific positions, or as an apparently uncoordinated series of movements during the execution of a pattern, or an inability to follow through with attacking or blocking actions during sparring.

Because of the physical differences between individuals, no two people will execute a motion or pattern in *exactly* the same way even if the principles have been applied equally. This natural variability, caused by the adaptations required during training by individuals according to body type, can be read as meaning that there are several possible though equally valid interpretations. However, as Tae-Kwon Do is based on the principles of physics, such variability must occur within clearly defined boundaries. In other words, the interpretative choices are limited.

### **Training environment and analysis**

A fundamental underlying principle governing the development of Tae-Kwon Do technique is one that requires the exponent to be aware of both the building blocks and how these link to execute an effective motion, or in the combination of a coordinated series of motions. Importantly, this not only includes all physical and mental aspects of Tae-Kwon Do, but also a conscious awareness of how one's body makes the adjustments required. Moreover, this awareness must extend to the environment and includes elements such as the surface type (e.g. rough, irregular, sandy, sloping, and slippery) and conditions (e.g. windy, wet).

Good and effective technique in which power is maximized can only come through this self awareness and analysis. The key lies in questioning the actions at each stage and reviewing how these affect subsequent actions. For example, during the transfer from one stance to another one may find that it is difficult to position the next stance correctly. Why is this so? What are the conditions? Here we may ask many more specific questions, including: did I pass through a neutral position at which the body is brought to a centre? Did I transfer mass too quickly and therefore missed the neutral position? Was I unable to develop a sine wave motion during the transfer? Was I relaxed at the beginning and during the mass transfer?

### **The geoscience link**

The interpretation of diverse geoscientific datasets, many of which may also be multi-dimensional, requires an acknowledgement and correct application of the principles inherent in the scientific method. Approaches to interpreting these datasets are ones that allow all the information contained in them to be coordinated, or integrated, in a way that limits the interpretative choices. Like Tae-Kwon Do, a partial acceptance of the principles results in an imperfect outcome, which in exploration geoscience could result in financial loss amounting to millions of dollars.

There is a diverse range of important data used by geoscientists to produce an internally consistent interpretation i.e. a focused outcome in which interpretative choice has been limited to a few, rather than many possible answers. Groups of these data can have direct corollaries with the fundamental skeletal and muscular construction and geometry of the Tae-Kwon Do student.

#### *The crustal 'skeleton'*

The first and most important of these geoscientific data is the one that equates to the skeleton of the Tae-Kwon Do student and their stance. This is the physical structure of the Earth's crust. Elements of this structure include breaks (faults) along which blocks of the crust move past one

another, an action that causes earthquakes, as well as a bending, or folding of the rocks. In order to understand this structure and to work with it in an interpretative sense requires a knowledge and understanding of the patterns and distribution of the different kinds of faults. Understanding the observed patterns and types of fault is similar to understanding the positioning of the body in a stance. By knowing how our body needs to adjust to achieve the correct arm and leg positions, spacing and angles we can predict what movement is required to achieve the correct position. Similarly, by using our knowledge of faults, their types and patterns, we can predict where other faults, not yet observed, may be and what their nature is. When combined other data the patterns provide a framework that illustrates the structure and processes that were important in the building of a mountain belt, such as the Alps of Europe, or the Himalaya.

This structural data is important for without it we cannot predict with any certainty how those structural elements control the other data patterns. In Tae-Kwon Do the basic structure is the stance, which is the starting point for every movement. A poor stance immediately limits stability, agility, flexibility and balance that ultimately mean that our attacking and blocking motions are a less effective. Similarly without an understanding of crustal structure we introduce uncertainties that severely limit our ability to interpret geologic history and to use the other datasets effectively.

#### *The crustal 'musculature'*

The Earth consists of a diverse range of rock types, as determined by the minerals present, each comprising a range of different minerals. These are present in combinations with only a few dominating the volume present. In different geologic environments e.g. mountain ranges and volcanic islands, rock types and proportions of different rock types usually vary considerably, although specific rock types may dominate over others. Where large volumes of a specific rock type are present, such as in mountain belts, the behavior of that belt as it evolves are governed by the physical responses of that rock type to the forces imposed. The effects are translated progressively to the other rock types that are present. It is often the case that these then respond in a way that shows a greater change than the dominant rock type. In other instances other, new rocks such as granite or gneiss are introduced into the changing environment, again influencing how the whole system evolves.

In Tae-Kwon Do a direct parallel can be drawn with the way in which the focusing of energy, which translates into power, occurs through a progressive transfer of motion from the larger muscles of the legs and abdomen through to the smaller muscles of the arms and feet. If this does not occur, then significantly less power can be generated. Furthermore, if the energy is not transferred effectively from the large muscles, then potential power is also lost. In the Earth we can also observe a process called 'decoupling' in which layers ride relatively undisturbed over other rocks that are experiencing substantial transfers of energy. This can result in lower mountains. During the execution of a punch in Tae-Kwon Do, we need to transfer energy smoothly and without interruption from the large to small muscles. If we are not doing this we are effectively decoupling or disconnecting one muscle group from another, resulting in a significant decrease in potential power.

## Earth Processes and the Theory of Power

In Tae-Kwon Do the processes involved are principally physical, although the effectiveness of these are conditioned and governed by mental processes that are primarily associated with movement, balance and muscle control. Earth processes are obviously physical and dominated by gravity, temperature and pressure changes at a planetary scale. The forces that are driving these changes are constantly active and as a result rocks are constantly changing, albeit this takes place over long periods of time, generally millions of years. Physical and chemical transformations occur in response to the processes, often with major releases of energy. We can compare many Earth processes with those that allow power to be generated in Tae-Kwon Do and draw parallels that help us to understand the importance of consciously applying the theory of power in our training.

Using the Himalaya mountain belt as an example, the physical uplift of rocks that were once deposited below sea level and now form the 8,000+m peak of Mt Everest, result from the 'squeezing' of the original submarine sediments that lay between two colliding continents (India and Asia). Firstly, the topographic extremes of the Himalaya attest to the rapid uplift of the rocks. Had the uplift rate been lower, then erosion would have prevented the high topographic altitudes that are typical of this mountain belt. This equates with Speed in the theory of power if we consider that the goal was to produce the highest mountains possible. Secondly, the energy during the early stages in the evolution of the Himalaya became highly focused along a position between the colliding continents. In the theory of power the direct equivalents are Concentration and Reaction force. The concentration, or focus, of energy along a narrow zone allowed the substantial uplift of the submarine rock sequences to take place, whilst the uplift itself is the *reaction* to the *action* of continental collision. Had there been less discretely focused 'impact' the Himalaya would not have achieved the topographic elevations now observed. Thirdly, the uniform nature of the Himalaya in the context of elevation and width indicates the collision between India and Asia was balanced i.e. the collision was uniform along its length. This could be compared with Equilibrium in the theory of Power.

If we forgo Breath control in this example, because breathing applies to humans, we can see that the Himalaya achieved its dimensions through a coincidence of forces that have direct correlatives in the theory of power. Had one of these not been present, then as in Tae-Kwon Do, the Himalaya would have achieved the status of the highest mountain range on this planet.

The use of breath control to aid in generating power in Tae-Kwon Do could be compared to the explosive eruption characteristics of some volcanoes. Volcanic activity in Hawaii, for example, is of the non-explosive type, because the lava has a low viscosity (more liquid in nature) and contains less dissolved gas. It is therefore able to make its way more easily to the surface with eruptions being relatively calm. In contrast, the parent magmas (molten rock source) for volcanoes in the western United States and many Pacific islands have a high viscosity and levels of dissolved gases. Because of their nature the molten rock and gases cannot escape as readily as the Hawaiian types and are trapped below the surface. Only when pressure builds and the cap rock ruptures does a rapid expansion of gases occur. This results in an explosive eruption during associated with the instantaneous release of energy. The other elements in the theory of power also apply here, particularly Reaction force and Concentration.

It is clear that the principles that underpin the application of the theory of power have parallels in two major Earth processes: mountain building and volcanic eruptions. The examples provided reinforce the need to fully understand the theory of power thoroughly if we are to maximize the effectiveness of Tae-Kwon Do attacking and defensive techniques.

## **Data gathering, interpretation and Tae-Kwon Do philosophy**

How the data is collected is equivalent in Tae-Kwon Do to the questioning required by the student to perfect fundamental motions, patterns and sparring. There is often no easy way of gathering the rock samples that are needed for compiling the basic data needed for interpretation. Frequently the environments in which data gathering occurs are very difficult ones to work in. These include high altitudes, cold temperatures, rugged mountainous topography, humid tropical rainforests and hot, dry desert conditions. These conditions must be met with fortitude through thorough planning and focus and the discipline to persevere and overcome them. Without persistence and discipline, the basic data required to understand the Earth will not be gathered and we would remain ignorant of processes that, for example, create earthquakes, tsunamis and volcanic eruptions to the greater cost of all.

The outcomes of the process result in new knowledge that needs to be communicated with all and especially younger geoscientists. As Tae-Kwon Do instructors should always be available to teach and guide, so should senior geoscientists willingly guide younger scientists in the physical and technical requirements of data gathering and interpretation. The goal should always be to help those to gain greater skills and knowledge than the instructor.

## **Interpretation**

### *Approaches*

As stated previously, there may be several equally valid interpretations of technique. In the interpretation of geoscientific datasets a range of interpretations is also possible. However, they may be quite divergent if one or more steps in the approach outlined above are missed. In Tae-Kwon Do this results in a less than effective technique, but in geoscience it may translate in a substantial financial loss. In both cases it is the understanding of the basic components, how these work together and a holistic, conscious view of the interpretative process that ensures the best and most effective outcome.

Interpretation, if it is to be effective, must therefore acknowledge all of the variables, the processes and their implications. Similarly, the Tae-Kwon Do instructor and student must be aware of the physical differences between individuals such as diversity in skeletal geometry, musculature, weight and height. In the analysis and interpretation of geoscientific datasets the complexities include accounting for and overcoming the fact that we can never have all of in data required to result in one outcome. One of the key challenges is to limit interpretative choice and in this context it is the process and understanding of the individual components, the processes and how they work together that are fundamental to success. A key lesson that can be borrowed from Tae-Kwon Do is that we need to thoroughly understand the methodologies for building technique. These are encapsulated in the 'Training Secrets' and provide clear guidance by defining the fundamental elements that underpin good technique. The training secrets are:

1. Study the theory of power thoroughly.
2. Understand the purpose and method of each movement clearly.
3. Bring the movement of eyes hands, feet and breath into a single coordinated action.
4. Choose the appropriate attacking tool for each vital spot.
5. Become familiar with the correct angle and distance for attack and defense.
6. Keep arms and legs slightly bent while the motion is in action.

7. Begin each motion with a slight opposite movement and once in motion the action should continue.
8. Create a sine wave movement by using the knee spring properly.
9. Exhale briefly at the moment of each blow, except in a connecting motion.

Unlike Tae-Kwon Do, where an individual can break down, analyze and subsequently construct for him or herself an integrated outcome in which all motions combine to maximize power while maintaining equilibrium, the interpretation of geoscientific data often requires the coordination of several individuals with specialist knowledge. However, providing one is aware and understands the importance of key data and the processes that operate in the Earth, a well constructed 'first pass' interpretation is possible. Coordination with specialists in related sub-disciplines can then follow to complete interpretation, because the key questions that determine the final outcome can be asked. In Tae-Kwon Do a superficial understanding can be gained from a book (the 'first pass' interpretation), but true understanding and effective technique only follows under the guidance of a quality instructor (the 'specialist').

Because of close parallel between the process of producing good technique and the process of interpretation, the 'Training Secrets' in Tae-Kwon Do can be directly adapted to provide a guide for effective interpretation in geoscience. A set of rules that guide effective interpretation can therefore be produced that bear a close resemblance to those that define the 'Training Secrets'. They can apply to an individual or a team. The rules are:

1. Study the physical, chemical and fluid processes operating in the Earth thoroughly.
2. Understand and acknowledge the linkages between and interdependencies of processes.
3. Ensure all relevant data is acquired
4. Be clear about the data hierarchy and what represents the fundamental dataset that will be used to guide the integration of all other data.
5. Choose the most appropriate data gathering or compilation methodologies.
6. Make sure that the approach involves integration across scales and through time.
7. Be aware of the need to ensure that communication and coordination between specialists occurs within an interpretation project.

There are similarities between the approaches in the sense that an understanding of the basic processes and their application are cornerstones of both. The key to perfecting technique in Tae-Kwon Do is to question why something has not worked. Where questions posed by a developing interpretation cannot be answered, we must also question the data or the processes we have invoked in order to be able to provide what may be critical answers for the interpretation to succeed.

## **Conclusions**

The principles and practice of Tae-Kwon Do contributes to the physical and emotional well being of those who choose to follow this path. Because it is based on physical laws and has a clearly defined structure, Tae-Kwon Do represents a fully integrated personal training system. In this sense it exercises both 'internal' and 'external' parts of the body, which includes the development of the mind.

Adherence to a logical structure and process that has a true basis will always produce the best result. As in Tae-Kwon Do, the process of interpreting geoscientific data has a logical structure

that includes constant questioning of a developing interpretative picture. It requires an understanding of processes and their outcomes which, because they are grounded on physical and chemical laws, provide a limited choice of possibilities. These will be recognizable and accepted by all who understand the importance of a thorough understanding of the relationships between processes and their application, such as understanding the Theory of Power and employing the 'Training Secrets' in Tae-Kwon Do.

It has been my experience that interpretative activities in which I am engaged are complemented and supported by the principles derived from my training in Tae-Kwon Do, and vice versa. This illustrates the inclusive nature and indeed power and benefits that training in Tae-Kwon Do can provide outside the Do-Jang.

### **Reference**

Choi, Hong Hi, 1995. **Tae-Kwon Do**. *International Tae Kwon-Do Federation (publisher)*, 765p.

*Brett Davies - August 2006*