Kinesiology for the Martial Arts

A Study in Movement and Power Management

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“Be like water making its way through cracks. Do not be assertive, but adjust to the object, and you shall find a way round or through it. If nothing within you stays rigid, outward things will disclose themselves.”  

Bruce Lee

In my thirty years studying the martial arts, I have always struggled with my movements and generating power. I am not the most graceful of people, nor am I the most athletic. I have struggled, sweat, cried in pain and frustration through more practice sessions than I care to think about. If there is one thing I can say, is that I have persevered. I do not think of myself as being very artistic, though I do have moments that surprise even me. I am more of a scientific guy, and as such, my papers over the years have ranged on a variety of scientific topics.

Over the course of my training, I have come across a great many instructors in a variety of martial arts. Every one of them tried to teach me something about their art; how to move, self defense techniques, sparring, both full contact and point. I learned how to fight from the ground, flip people through the air, and absorb energy only to deflect it back in the direction of my choosing. In each case though, no one could explain to me why things worked the way they did. I repeated every technique, form and movement by rote, but never knew why.

It was only when I became an instructor myself, that I wanted to do better than my instructors had done for me. I bought every book I could find. I looked through old notes, called up old friends, quizzed every instructor I could find until I was satisfied that I understood the science behind the technique.

When I was first invited to the Masters Clinic in 2011, I was not sure that I deserved it. All of these people have studied very hard to get where they are today. The masters I have met were all people that were so far above me that I did not even know how to ask them a question without sounding silly. All of them have trained to pass on their knowledge, and have areas of expertise that I could not imagine to even come close to.

I was only after many months of self contemplation that I realized that they were all people like me and I do have something I want to give back. I want to give you the accumulation of all of my knowledge of movement and body mechanics in the hope that it can become a teaching tool for those that choose to read it. I know that I myself have grown from this endeavor, and my fellow instructors that have helped me to proof read it have already learned something, (or so they say.)

This essay, while long enough, is the first of what I hope will be several parts that will break down how I have studied the movements in the martial arts, added science to the mix, and given the reader ideas on how to get power with less effort. In the future, I hope to take the principles in this paper and apply them to our Il Soo Sik Dae Ryun and do a better job of explaining how to teach them in a manner that I have found useful, and has helped my students to use the techniques to this day.

This essay then is submitted to you with great honor and respect and I hope you will find it interesting.
What is Kinesiology

Kinesiology is the study of movement. Knowledge of human anatomy and physiology is important so that one can understand how the muscles, bones, ligaments and cartilage work together. Sports Kinesiology combines methods and philosophies from osteopathy, traditional Chinese medicine, functional anatomy, energetic medicine, strength and conditioning, chiropractic, nutritional medicine and bodywork therapies. It is a holistic approach to healing, health and well-being that considers all aspects of the person, physical, emotional, mental and spiritual. Study of Kinesiology is important as we progress in the martial arts so that we can gain the most power from our bodies, maintain proper body position and alignment, and coordinate our movements. Since the human body is interconnected in every way, every thought, feeling and emotion creates a physical and physiological response and is stored in our cellular memory for the rest of our lives. Our physical body and its every restriction, injury or movement has a direct impact on our physiology and our mental/emotional state. The study of body movement is also useful in the art of self defense. By knowing how the body moves, allows one to know how to make the techniques quick, efficient, and effective.

The goal of a Tang Soo Do practitioner is to become one with nature. I believe that an understanding of the laws of physics, the study of movement, and the knowledge of how to apply it will help the reader to come closer to that goal.

Study of body movement as it applies to the martial arts can be broken down into several sections; stances and body alignment, coordination and timing, and generation of power. “Because all human beings possess basically the same musculature, skeletal structure, and nervous systems, and because we are all subject to the same unalterable laws of physics, there can only be one most efficient way of performing a reverse punch or any other technique. So, if you want to maximize the strength and efficiency of any given type of physical movement, it behooves you to examine how you can best utilize the strength and structure of your body and the principles by which it works.”

Finally, putting all of this knowledge together, we can re-look at the required Il Soo Sik Dae Ryun techniques and see how to improve them. We can then come up with a teaching plan for refining the performance of the Il Soo Sik Dae Ryun techniques.

As with all other training in the martial arts, I need to start with the basics, and the most basic of these is our posture and our stances.

Posture

Most people think of your posture as just standing up straight. A posture or stance can also be thought of as the representation of our physical, emotional, mental and spiritual selves. All of our experiences of our lifetime can be viewed through the window to our posture. If the eyes are the gates to the soul, then the posture is the map of the journey.

“Our posture does three things:

1. It insures for the body and its extremities a position which is most mechanically favorable for the next move.

2. It enables one to maintain a “poker body,” a body that reveals no more of its intended movements than a “poker face” reveals the cards of a player.

3. It puts the body under that particular tension or degree of tonus which will be most favorable to quick reaction and high coordination.\textsuperscript{2}

Some common influences on our posture can include:\textsuperscript{3}

Exercise programs - a poorly designed exercise program can alter posture for the worse, while a well designed program will consistently improve posture.

Nutrition - poor nutrition leads to organ stress which then carries over and affects the musculoskeletal system.

Muscle balance - When muscles get too strong relative to another muscle on the same joint, they pull posture in that direction. A common example is tight chest muscles pulling the shoulder forward due to the weaker back muscles.

Emotional health - Depression has been associated with a stooped posture.

Stress - Our stress levels will tense our muscular system, altering our postural mechanics.

Injuries - An injury such as a broken leg will shift our posture away from the injured side.

Sleep - A lack of sleep will lower our available energy levels making it harder to maintain good upright posture.

Hormones - Hormones have incredible effects on the musculoskeletal system.

Work Environment - Sitting at a desk all day will alter posture towards the position which has been adopted.

Motor Programs - faulty movements encourage over development of certain muscle groups.

Respiration - breathing through the mouth will generally pull the head forward and collapse the chest.

Vision - Poor vision will often lead to straining of the neck to see clearly.

Jaw Mechanics - Altered jaw mechanics will alter the mechanics of the sacro-iliac joint. Occipital/Atlantal joint and the ankle joints.

Visceral Health - our organs reflex their stress into our muscles.

Sports and Work Activities - This can be dominance of a movement pattern ie. a golfer being rotated towards the side of the swing.

Flexibility - poor flexibility often leads to poor posture.

Spinal Subluxations - any spinal change will obviously affect posture.

Spiritual Changes - This is very similar to emotional stress.

\textsuperscript{2} Lee, Bruce. Tao of Jeet Kune Do. Valencia: Black Belt Communications LLC, 1975. 30 Print

Primitive Reflexes - These reflexes are ingrained into our central nervous system from in utero and have a high degree of influence on our motor skills. Underdevelopment of a primitive reflex will generally impair movement skills and thus degrade posture.

Parental Influences - Children will observe their parents and copy them.

**Stances**

“Stances are static positions. You move from one stance into another. All stances are intended to do one of two things.

To serve as a stable position from which you can move quickly, and

To serve as a stable platform from which you can launch techniques.”

“Just as a strong building must be built on a firm foundation, you will only achieve power, stability, agility and flexibility with good stances.”

In the beginning of our training, we learn how to stand in each of the different Tang Soo Do stances. This is a difficult task for the beginning student and is the cause for most failures in technique and balance. The problems are that the stances are not natural and the legs are not strong enough to hold the body in the proper positions. After time, the students start to gain strength in their legs and the stances start to feel more comfortable.

A common teaching misconception especially in the front stance, is that the back knee that is straight. In reality it is never really completely straight. There is always a very slight bend to the leg, but you must still be strong enough in the stance to allow you to push down towards the ground while the toes grab the ground. The reason for this will be discussed later in this paper.

There is a big debate when you talk of stances concerning form versus function. This can be seen when you look at traditional martial arts stances and compare them to stances from arts such as Muay Thai or boxing. While karate stances provide a solid base from which to deliver strikes and kicks, these stances tend to hamper movement and mobility. Muay Thai and boxing stances are more upright and not as wide because the practitioner depends more upon mobility and not stability. The traditional martial arts stances are designed to permit the maximum use of external force (the floor in this case) to increase the internal force (our own body musculature) into a technique. A good stance, coordinated with proper breathing and correct posture helps to transfer the forces from the feet into the techniques, helps to absorb any recoil forces from the contact of the technique, and enables smooth shifting and change of direction.

Another difference in the stances is in how the practitioner stands on his feet. A Muay Thai fighter stands more on his toes whereas a beginning traditional martial artist stands more flat on his feet, or even more towards the heel. This throws the balance and power of the stance off as I will explain below. A good example of where you can feel this power difference in every day life is in bicycling. If you have the saddle too low on your bike and press the center of your feet into the pedals, it is hard to generate force and speed. Optimally, the saddle should be high enough to allow the knee to be slightly bent at the pedals full extension with the ball of the foot on the pedal. Try this on a bike and you will immediately notice the difference.

The “most important method in which to develop each stance is to perfect them in motion and not in a stationary state. Through such development stance changes become effortless, your speed, your poise and balance will be enhanced, and spring action will be available instantaneously.

4 Lee, Bruce. Tao of Jeet Kune Do. Valencia: Black Belt Communications LLC, 1975. 47 Print
The most noticeable aspect of stances in motion, although not absolute, is the proud erect posture which allows a practitioner to flow across the ground. Even when kicking or maneuvering, the practitioners erect posture and calm expression do not betray him.5

“Humans tend to stand lazily with the body weight supported by bones rather than by the muscles. By standing back on the heels with the legs straight the thighs are soft and inactive”6

In the end, stances need to be tailors to the individual. The height, width, and depth of a stance should be adjusted according to the size, weight, and height of the person.

No matter what the art or the stance, there are a few common rules among them all.

- The stance should be very soft and not too low.
- The center of gravity should be between the legs.
- There should be continuous pressure to the floor using the breath and the yongquan point that will be discussed later.
- During the execution of a technique, the stance should be strong enough to absorb impact shock without loss of energy or loss of balance.
- Utilize the widest stance possible without losing muscular control.
- Upper legs and hip muscles will apply twisting tension from the inside to the outside or from the outside to the inside to connect the legs to the torso and to maintain potential energy for a quick change.
- Apply strong downward pressure to the floor at the time of impact

**Center of Balance**

“The physiological and anatomical center of Gravity (or Balance) is about 3 inches below the navel, and 3-4 inches inward, in the Sacral Region of the Spinal Column.”7

“Balance is achieved only through correct body alignment. The feet, the legs, the trunk, the head are all important in creating and maintaining a balanced position. They are the vehicles of body force. Keeping the feet in proper relation to each other, as well as to the body, helps to maintain correct body alignment. Always leave the space of at least a natural step between your feet. By doing so, you are braced and never standing on just one point.”8

By not getting your feet crossed when you step, you are not likely to be pushed off-balance or knocked down because of bad footwork.”9

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8 Lee, Bruce. Tao of Jeet Kune Do. Valencia: Black Belt Communications LLC, 1975. 47 Print

9 Lee, Bruce. Tao of Jeet Kune Do. Valencia: Black Belt Communications LLC, 1975. 48 Print
When discussing stances maximum power and mobility are obtained when the center of balance is as low as practically possible. If the center of balance is too high, the body is unstable and leg movement is limited, so power and mobility are reduced. If the center of balance is too low, it is difficult to use the inner thigh muscles for leg movements which limits both power and mobility. A good martial arts stance is one which the center of gravity can be maintained through as much of the fight as possible. If you are balanced, it is due to control over this center of gravity. Aside from the center of gravity, the placement of the hands and feet should simply be placed so that quick, controlled, and effective blocks and strikes can be delivered at will in a manner that doesn’t conflict with the center of gravity and other body parts. Eyes should be focused on the opponent's eyes in such a manner that the peripheral vision encompasses their whole body. The exact fighting stance is just a matter of training and experience. In arts such as boxing, the hands are up to guard the face and decrease the chance of a knock out. In traditional martial arts, the different stances can be used for different situations and in conjunction with the different defenses or attacks.

In traditional martial arts when sparring, we most commonly move in a slide step or step slide fashion. When stepping in this manner, we release the weight from the moving foot and push off the supporting leg using the inner thigh muscles to propel the body. The movement of the slide step is very nice in a defensive situation because the moving foot remains in contact with the ground. In a street situation where you cannot see the ground or what may be lying upon its surface, or where there may be holes or something slippery, the foot clears the path, you are “seeing” the ground with your feet as you move. The problem is that once you start to move, you are committed to that movement, so if the foot is not on firm ground, you may expose yourself to an attack or the possibility of falling.

A STEP SLIDE movement is when the first movement with either the front or back foot, has that foot leaving the ground and moving in the direction you wish to go. Once that foot has arrived at the desired location, the other foot slides along the floor with the entire foot never leaving but always maintaining contact with the floor.

A SLIDE STEP movement is the opposite of the one previously described. In this case, the first foot that moves slides along the floor, then the second foot to move steps to a position where you are back into a proper stance. In both cases, you need to try to avoid crossing your feet for a long period of time without obtaining a proper stance so that you are not caught off balance. It is in these transitional stances that you are most vulnerable.

Along with moving in this step-slide or slide-step fashion, there is a need to understand the many possible angles in which you can step from your starting position. This was best described to me in the books by Ed Parker “Infinite Insides into Kenpo.” In these series of books, he described a Universal Pattern which diagrammed some of the possible angles that a person can move. (See picture on the left)

An understanding of this simplified pattern shows that movement can be complex, but flexible in any direction. A careful study of this pattern is worth your time.

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Each of the joints in the lower extremities and pelvis can effect your stance and posture. Let’s investigate each of these individually. It is important to learn the proper position of our legs when we are in our stances so that we can be in the proper position for kicking, punching, blocking and moving.

Knee

In the long stances typically associated with Tang Soo Do, the knees are either bent or straight and the feet farther apart than in many other styles of martial arts. This allows the center of gravity to be lower making your moves more stable. When the front knee is bent it should not be bent so far in one direction that it is pushing out beyond the foot. This places excessive force on the knee which then disrupts the generation of force. The ideal position of the front knee is directly above or in line with the front foot with the foot pointing forwards or with the toes pointing 45 degrees towards center.

As stated earlier, the rear knee should not be fully extended. Why? A muscle produces power only when it contracts. Therefore, a muscle that is fully extended doesn’t contract and it’s unable to produce any power. So, if the rear leg of a front stance is stretched out and the knee is locked straight, the rear foot cannot be pressed against the floor and produce the striking power that is required for the delivery of a truly powerful blow. (See picture on the right)\(^\text{11}\)

The driving foot (the back foot in a front stance) presses against the ground for only a split second, so that the time that striking force is applied is minimized as much as possible.

Don’t tense your ankles. Just grip the ground firmly with your feet and shove your driving foot through the ground.

In a fighting stance, the common practice of a beginning student is to stand with the supporting back leg too straight. They also have to overcome the tendency to stand with too much weight on the front foot. The foot need to be in the proper position with the back foot set at 90 degrees to the front foot, the feet about shoulder width apart, the front leg resting on the ball of the foot, and the shoulders and hips turned to a 45 degree angle. Bending the knees slightly once again lowers the center of gravity and make the stance more stable. But as stated before, by having the legs at least slightly bent allows the leg muscles to contract, pressing the support leg into the ground and increasing the striking power required for the kick. This stance is also more agile than the front stance which is why it more commonly used in sparring techniques. What more people do not realize until they study the stance in more depth, is that the position of the shoulders and hips play a big part in generating power when in this stance. More on this later in this paper. (See picture on the left)\(^\text{12}\)


Foot

The feet play an important part in the stance since they are your connection with the ground. In a front stance, the front leg should be as vertical as possible. Your weight will then be centered directly over the spot on the bottom of the foot known as the yongquan point. In Chinese martial arts it is believed that it is through this point that the martial artist draws energy from, and roots himself to the earth. It is also at this particular area of the sole of the foot where humans naturally balance themselves. 13 (See picture on the right) 14

When standing in a stance, the foot that is flat on the floor is where you get your power from. In a front stance, whether you have shoes on our not, the yongquan points are “suctioned” to the ground. This is easier in bare feet, but the concept is the same with shoes on. In bare feet, you grip the ground with your toes, but don’t clamp down so hard that the tension goes back up to your knees. If you concentrate on grabbing the ground with your big and pinkie toes, the others will follow suit.

“The weight of your body mustn’t sit on your heels or on the balls of your feet, lest you lose your balance when the reaction force of your blow zips back through your body and down to your driving foot. Instead your weight has to be settled into the centers of the soles of your feet.” 15

Hips

In Korean martial arts, we concentrate on gaining our power a lot from the hips. If we expand the beginners concept of what the “hips” are to include the area of the lower back, and abdominal muscles as well, then we have a better idea of what all is involved in generating power from our “hips.” But in looking at the fine details of the important parts of the core of the body, we need to look at the inguinal crease. This is an important area to focus on because if it is not manipulated correctly when we move, then our ability to effectively generate internal power will be seriously hampered. The area of the inguinal crease consists largely of the iliopsoas muscle or Gua in Chinese. (See picture on the left) 16

14 Starr, Phillip, Martial Mechanics, Berkely: Blue Snake, 2008, 52 Print
16 Starr, Phillip, Martial Mechanics, Berkely: Blue Snake, 2008, 134 Print
When you sit in a proper horse-riding stance, you should sit straight down from the area of the inguinal crease. The easiest way to do this is to sit with your feet at the proper width and then place your hands on your hips so that your forefingers point down into the crease of your leg and groin. As you press straight down, your hips will sink and you will sit in the stance correctly.

**Upper Joints**

**Shoulder**

Most people don’t believe that the shoulders have much to do with throwing a punch. In fact, the shoulder is one of the most complex joints and is involved in the transfer of power when punching and blocking. If your shoulders are raised or tense, it can cause the power you are generating to stop at your chest. If your shoulders are pulled back too far, then they are left out of the loop when they are supposed to be pushing the elbow forwards for a hand technique.

The shoulders are also important in the twisting motion of a kick. The twisting movement that you start when you press against the floor and start your hips moving forwards can all be stopped if you do not move your shoulders along in sync with your turning actions.

The shoulder also provides a stable platform for chokes and head butt techniques. By placing the opponents head on your shoulder, the head has no where to go to release the pressure of the applied choke.

The shoulder is also important in forming the Tan Sau triangle, which is described in Kung Fu as being vital in describing the best triangle that is formed by the arms when blocking. While the triangle may be slightly changed, is it always there in order to form a strong bent arm.

If you don’t think that the shoulder is important in your martial art techniques, then try to practice your basic self defense techniques with an injured shoulder like I have.

**Elbow**

The elbow should never be straightened out all the way. Straightening the elbow out so that the point of the elbow is horizontal puts it in a position of over extension and possible injury. Not having the elbow

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17 Happej Kung Fu, “Knowledge of Science Can Be useful to a Kung Fu Man - Part 5” Happehtheory.com. Web 25 Aug 2010
turned enough causes you to not have enough rotation leaving too much spring in the arm. This causes a loss of power, penetration and decreases the driving force you are trying to generate from your hips and legs.

During a block or punch, the arm should rotate as it progresses from the hip to the point of impact. In Kung-Fu and Jeet Kune Do, it is very common to use a vertical fist, but a vertical fist, while it is able to do a better job keeping the wrist in a strong position, it places the forth and fifth knuckles in a bad position. Unless the practitioner has trained for a long time, the possibility of getting a “boxers fracture” is very high.

The other reason for rotating the arm all the way through the technique is to get a full extension on the punch as well as generating power from the torquing action of the arm. (See picture on the right) Just like a bullet being fired from a gun, this twisting can help to keep the fist going in a straight line towards the target, carrying the energy that has been generated with it. One has to be sure that the arm is straight from the elbow through the wrist at the time of impact. Leaving the elbow to “wing out” away from the body means that the energy and power doesn't get driven into the target, but instead the arm reflects the power back to where it came from.

One common theme with all hand techniques is to keep the elbow in close to the core of the body as much as possible. If you look at the mechanics of the major hand techniques you will find this to be true. This concept will also be discussed in the section on Using the Power Triangle in Basic Techniques. Keeping the elbow in close when punching also keeps the bones of the forearm (the Radius and Ulna), in line to help propel the energy in a straight line towards the target.

Keeping the elbows in close also allows the shoulder to remain in a strong position which aids in the generation and delivery of power. More on the will be discussed in the Shoulder section of this paper.

Wrist

The wrist plays more of a part in the production and delivery of power than most people realize. The wrist is one of the smaller joints in the body and sits directly in the path for the delivery of power for any hand strikes. It is important to realize that the proper positioning of the wrist is with the joint straight and not bent with hand bent up or down. Having the wrist straight places all of the bones, muscles and ligaments in the proper place so that there is minimal damage to the hand or arm.

Take for example, a horizontal elbow strike. It is common for a beginning practitioner to flex the wrist when performing this strike to an attackers head. This actually decreases the power and after this has been brought to the attention of the student, they can feel the difference and realize the mistake. The forearm actually feels like a piece of steel if the elbow and wrist are in the correct position when striking.

A common positioning problem happens when the beginning student performs a Sah Dan Ma Ke. The wrist needs to remain straight with the pinky knuckle pointing upwards at a 45 degree angle. The elbow

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should be about one fist distance from the ear and the wrist about one fist distance from the crown of the forehead. This position places the two bones of the forearm in the correct position with the two bones lined up and strengthening each other. Both sets of muscles on the top and bottom of the forearm are equally activated and adding strength. The elbow is bent to a 90 degree angle and the shoulder is at a 45 degree angle. The wrist covers the majority of the head to make sure the block is complete.

A punch that people don’t give too much attention to is the uppercut. The uppercut can be a very devastating technique and is the source for many knock out punches in boxing. The problem most people have once again is that they flex the wrist when delivering this punch. Only by keeping the wrist straight can all of the power from the legs and hips drive up through the wrist and hand to the abdomen or chin of the opponent.

Keeping the wrist straight, but relaxed is important in transferring the power generated from your legs and hips through all the way to the target. The final snap turn of the wrist is a secret that gains you more depth and penetration of the power you have generated, as well as helping to generate power in it;’s own right. Keeping a straight wrist is also important in making sure that your Ki does not stop and become stagnant.

Newton’s Laws of Motion

“One of the most important things students, and teachers must realize about a technique is that it is only a means to manifest physics. It is not the physics themselves. The technique is NOT what gets the job done, manifesting the physics is what makes the technique work. Let’s restate that for clarity: Just doing the technique is not going to get the job done, understanding the physics behind the techniques is what makes it work.

The power doesn’t come from the technique. Power comes from the principles and physics that a technique manifests. The consistent creation and application of those physics in your movement is what I mean when I say the skill sets you must master and ingrain. These are the elements that technique is based on. That’s the difference between flailing and delivering power.”

In order to apply physics to your techniques, you need to know what the physics principles are for the martial arts.

The following definitions and explanations of physics are important to understand if we are going to apply them to our martial arts and self defense techniques. The following explanations can be found in most high school and college text books.

Law of Inertia

Newton’s 1st Law states that an object continues in a state of rest or of uniform motion in a straight line unless acted upon by an external force.

Inertia is the body’s resistance to change in movement. It is proportional to mass, thus the mass of an object is the measure of its inertia. Mass should not be confused with weight. The weight of a person (or an object) is the measure of force with which the earth pulls on the body's mass. The more mass a body has, the greater the earth’s attraction on it, the more it will weigh. Weight is a force; whereas, mass is not. It has no direction. Mass is the resistance to change (i.e., inertia).

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Lowering your stance increases your mass while not increasing your weight. This increases your inertia and makes your opponent use more force to move you. This also gives you a more stable base from which to launch your techniques.

**Newton's 2nd Law (the Law of Acceleration)**

When a body is acted upon by a force, its resulting acceleration is proportional to the force and inversely proportional to the mass. Hence, with a constant mass, the greater the force, the greater the acceleration. And, with a constant force applied, the greater the mass, the less the acceleration. Another way of saying the same thing is: “The velocity of a moving object will remain constant unless a force acts on it.”

This is why we need to keep our limbs relaxed when we kick or punch. Tension creates a force that slows us down.

**Newton's 3rd Law (the Law of Action and Reaction)**

The third principle of motion can be stated as follows: If one body exerts a force on another body, the second body will exert an equal and opposite force on the first body. Hence, it is sometimes referred to as the principle of action and reaction, which can be stated: “For every force, there is an equal and opposite reaction force. Essentially, Newton’s 3rd Law is a statement that forces always exist in pairs. For example, when I take a step forward, I press our foot against the floor. Because of the friction between the foot and the floor, I exert a backward force on the floor. The reaction force is the equal and opposite force exerted by the floor on our foot. It is this force, which acts in the forward direction, that moves us in the forward direction.

This is why our counterforce hand is important, it helps push the punch forward. Without this help, the power will go places we don’t expect it to go.

**PRINCIPLES RELATED TO THE LAW OF INERTIA**

**Combining translatory and rotary motions**

The combined motions, if performed correctly with proper timing and sequence, will produce maximum final velocity of an object in the desired direction of release (e.g., discus toss, bike riding, car).

This is the theory behind the side kick. The rotation of the body start the rotary movement, then the actions of the hips and knees translate this energy into a linear form so that the foot moves in a straight line from the hip to the target.

**Continuity of motion**

The accomplishment of the first motion represents the overcoming of a certain amount of inertia and, therefore, any hesitation prior to the next motion will result in loss of some or all of the advantage gained by the previous motion” (e.g., backward roll, pole vaulting). Interruption of motion costs energy.

The turning of the front foot into the direction that you are wanting the hips to rotate over comes your inertia. This combined with the pushing of the back leg against the floor causes your hips to turn and start to gain momentum. As a white belt we teach the student to do each kick in a start and stop fashion. This is just to teach them the proper movements in the correct order. As we progress, we should strive to make the entire movement fluid and not stop the power once it has started. Otherwise we have to overcome inertia each time and this requires more power and energy from the martial artist.
Effects of momentum

More momentum can be produced with a longer implement in that the end will move faster than a shorter implement” (e.g., Longer legs will produce more momentum and a harder round kick).

Transfer of momentum

Momentum developed in a body segment may be transferred to the total body, but only while the body is in contact with the supporting surface (e.g., earth, diving board).

In other words, we cannot change direction of our rotation unless we are in contact with some surface that we can push against.

PRINCIPLES RELATED TO THE LAW OF ACCELERATION

Acceleration is proportional to the force causing it

A sprinter can increase acceleration by increasing the force that he/she applies backward and downward against the surface on which he/she is running and, if he/she should double the force, then acceleration would double and, similarly, if he/she should keep the force constant and reduce mass, he/she would increase acceleration. This is why a smaller person that is able to move faster can produce more power than a bigger person that moves slower.

Maximum acceleration and efficiency of motion

To achieve maximum acceleration, all available forces should be applied sequentially with proper timing and as directly as possible in the intended line of motion. This works along with the Continuity of Motion rule except that this rule includes the adding of force consistently throughout the entire process.

Effects of body's radius on angular velocity

The rate of rotation is increased as the radius of rotation is decreased (e.g., Keep your hand and feet in close to your body when rotating). This is why I stress to my students that they keep the leg bent as much as possible throughout the entire turn of a spinning kick or any turning kick such as a round house kick.

Conservation of momentum in swinging movements

To build or to conserve momentum in any swinging movement, the radius of rotation should be shortened on the upswing and lengthened on the downswing. (This is another reason why we need to collapse and pull in the leg after performing a hook kick, crescent kick, axe kick, or a ridge hand strike).

Twisting movements

Are based on the transfer of momentum from part to whole, when in contact with a surface (have to initiate the twist in some way at the start of the movement). (Twisting the wrist will twist the elbow and then the shoulder).

“In Chinese martial arts there is a special technique called Chan-si jin which sounds exotic, but really is simple to understand. In this technique, the rear foot is “screwed” down into the ground at the very beginning of a technique. The power is made to spiral up the leg, around the waist, up and over the back and shoulder, down the arm, and out to the striking surface of the hand where it is finally released. This dramatically increases the distance over which the force accelerates, adding tremendous impetus
to the final blow. Chan-si jin is translated as “silk reeling power” because of its similarity to pulling a strand of silk from the cocoon of the silkworm.

Just as the delicate silk fiber must be drawn evenly and smoothly, so the spiraling movement of power in your body must travel without slowing down or stopping momentarily at any given point. (See picture at right) 20

Such interference severs the smooth transmission of power and much of it will be lost. 21

**PRINCIPLES RELATED TO THE LAW OF COUNTER FORCE**

**Surface variation and the amount of counterforce**

The counterforce is equal to the applied force when a stable surface is used. The less stable the surface, the less will be the counterforce. (e.g., performing a front kick on ice or sand decreases your power as compared to performing the same kick on a stable floor).

**Direction of the counterforce**

The direction of the counterforce is directly opposite that of the applied force. The counterforce is most effective when it is perpendicular to the supporting surface. If not perpendicular, the force is separated into two components, vertical and horizontal. Hence, it is important to consider the trajectory angle. (e.g., counter force elbow needs to come straight back to the pocket and not drop when you are punching).

**Counterforce in striking activities**

The amount of force a striking implement imparts to an object depends upon the combined momentum of the implement and the object at the moment of impact (i.e., how is the force dissipated). Also, it depends on the mass of the object and the implement. (e.g., Heavier wood bo’s will impart more force than a lighter weight one if the speed of both of them is the same).

A collision is a brief contact between objects in which the force associated with the contact is much larger than other forces acting on the objects. When a tennis ball collides with a racket, for example, the contact force is much larger than the gravitational and air resistance forces that the ball and racket experience.

When two objects collide, they exert equal and opposite forces on each other. When two objects are involved in the collision, they both experience the same force. And because the contact time associated with the collision is the same for the two objects, the impulse applied to each object as well as the change in momentum experienced by each object is the same. So in a collision there is a conservation of linear momentum. This means that the sum of the linear momenta of the two objects (A and B) before the collision is the same as the sum of the linear momenta after the collision.

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Temporarily stored counterforce

If a surface or implement used in a performance has elasticity, then an applied force produces bend or compression that represents stored force, and the stored force increases the propulsive force over what it would be if elasticity were not present. (e.g., a flexible rattan bo or stick will flex as it is swung. This stored force will then increase the force applied upon impact).

Surface contact while applying forces to external objects

In throwing, pushing, pulling, and striking activities, one or both feet should be keep in firm contact with the floor until the force providing motion is complete, otherwise the maximum force is decreased.

PRINCIPLES RELATED TO FORCE

General Principles of Force

Total force

A total force is the sum of the forces of each body segment contributing to the act, if the forces are applied in a single direction and in proper sequence with timing. (e.g., this is why punching with your entire arm from the hand all the way through the shoulder and the waist will impart more power than a punch that uses just the arms).

Constant application of force

A force should be constant in which a minimum amount of energy is used to overcome inertia. To do otherwise is to waste the effort (energy) put into the activity (e.g., pushing a car or some other object).

Direction of force application

All forces should be applied as directly as possible in the direction of the intended motion (e.g., running with feet pointed straight forward).

Distance of force application

A body develops greater velocity as the distance over which the force is applied increases (e.g., for martial arts performer rotates first to increase the force of the kick). Kicking form the back leg creates greater distance and thus a more powerful kick.

Self Produced and Other Forces.

Effect of the angle of application on the force produced

In angular movements of body segments, the maximum effective force and velocity occur when the limb is at right angles to the direction in which the object is moved (e.g., karate punches in which the punching arm is straight forward, not up or down, so the arm is perpendicular to the body).

Initial muscular tension

Placing muscles on stretch, (performing two identical techniques such as a double punch with the same hand) before contraction increases in the force of muscular contraction. (e.g., This is why some people perform a double hop prior to doing a jumping or spinning kick and is the theory behind Plyometrics).

Force Absorption
An athlete prepares for impact (as when falling) by placing the shock absorbing joints in extension, but not locked. The position of the limbs provides more distance to absorb the force compared to a flexed position (shorter distance). As contact is made, the extended joints flex due to the impact and immediately absorb the force of impact. The force is gradually reduced by eccentric (i.e., lengthening) contraction of the (e.g., elbow) extensors (and shoulder flexors). The force of impact is distributed over either a greater time (distance) or area of the body or both.

**Types of Motion**

When a body at rest has been upset, the body has been put into MOTION. Thus, what is implied is a change of place or position involving direction and speed. There are three major classifications of motion:

- Linear motion
- Curvilinear motion
- Rotary motion

Linear motion (also known as translation or translatory motion). Meaning, a person is said to move as a whole with all parts moving in the same direction. If the path is straight, it is linear. Curvilinear motion (also known as translatory non-rectilinear motion) is defined as an object that moves in a curved path. The motion has a horizontal (straight) component plus a force that pulls it inward. Rotary (or angular) motion occurs when some point within a system is secured or restricted so that the system will rotate around this point when it receives force. The point serves as its axis. Think of the Universal Pattern as you work through this section.

**Linear motion**

When I see something or someone move I know a force is responsible for the motion. I know this because Newton’s first law of motion says that a body at rest will remain at rest unless acted upon by a force. This is called the Law of Inertia. The inertia of a person or thing is essentially its mass. Inertia is resistance to movement. The more mass a person has the less easy it is to move that person. Another way of saying the same thing is, the more inertia a person has the more force which will be necessary to move that person.

A force may be generally defined as a push, pull or tendency to distort. The formula for calculating force is mass times acceleration. (F=ma)

Acceleration is defined as a change in velocity. Velocity is the rate (speed) at which a body might move per a specific unit of time (such as feet per second or miles per hour). Therefore, when I see a body change its velocity, I know a force has acted on it. In the simplest sense, this could mean that a body was standing still and then moved. It could also mean that a body was moving and then changed its velocity (as in speeding up or slowing down). If this were the case, again, I would know by Newton’s first law that a force is present. I know this because Newton’s first law states that a body in motion will continue in motion in the same direction at the same velocity unless acted upon by some force. This introduces another possibility, that is, a body could move in one direction and then change direction. When this happens, I know that a force caused the change in direction.

Once a body has been put in motion, it has momentum. How much momentum it has is determined by how fast it is moving and how much mass it has (by formula, Momentum = Mass x Velocity). This would imply that while a force acted on the body to move it (a force sufficient to overcome its inertia), the force is no longer acting on it. Since Newton’s Law of Inertia says that the body will continue to move unless
acted on by another force I would expect to observe the momentum of that body continue unless resistance forces (such as gravity, friction, or air resistance) slow it to a stop.

It should be obvious that it is going to take more force to move a large mass. Ten pounds is twice as much as five pounds. It will take twice as much force to move 10 pounds as it will to move five pounds. When enough force is applied to move either 10 pounds or five pounds and they were both given the same speed of movement (velocity), the 10-pound weight would have twice as much momentum. Remember that momentum is not just velocity. While momentum is movement, it is made up of both velocity and mass. For example, it would take more effort (force) on your part to catch the 10-pound weight (twice as much effort) as it would for the five-pound weight if both traveling at the same speed (velocity).

The effect of gravity on the body

Gravity is a force because it tends to accelerate a body. Gravity is a phenomenon that exists on earth. It is a force that attracts everything in the earth’s atmosphere to the center of the earth. It is as if the center of the earth is a magnet that draws everything with mass towards it.

It is important to understand that the effect of gravity is very close to being a constant. That is, the force of gravity will accelerate any body at the same rate (e.g., 32 feet per second per second). That means that as long as a body is free to fall it will accelerate at a rate of 32 feet per second every second. A body dropped from a plane will have a velocity of 32 feet per second at the end of one second, 64 feet per second at the end of the second second, 96 feet per second at the end of the third second and so on.

Application of these linear forces to the body

All of this knowledge is necessary to understand how to get force, how to direct it, and some of the problems of moving and/or stopping bodies that have more mass. Muscles are responsible for generating much of the force to move the body and to redirect it once it is moving. How well it moves depends on how much force can be generated (strength and/or power) and how much inertia (body weight) there is to overcome.

Martial artists need to know what the objective of each skill is and how to position the body to direct the necessary forces appropriately. When gravity is used as the prime mover of the body, martial artists must come to an understanding of its positive and negative effects. In so doing, they are able to adjust body parts and/or position to, for example, get the most out of their self defense techniques.

Curvilinear motion and Angular movement

Angular movement is rotational movement. When something rotates, it always turns about an axis. The axis may be real as in the hinge of a door, the center of a turnstile, the axle of a wheel, or a horizontal bar. It may be imaginary, as a body rotates in the air, free of support. In this case, the axis of rotation is the exact center of gravity of the body. This is the point at which all of the weight of the individual is centered (i.e., the exact middle of the body). That middle or center changes every time the body changes shape. If the arms are raised overhead, weight is moved away from the original center of the body and now the center has moved in that direction. When a body is in the air rotating, it always rotates around its exact center no matter where that center is located. Angular motion is described by degrees through which something moves.

The concepts of angular motion are similar to linear motion, but the terms change in order to specifically identify an association with rotation. It still takes a force to overcome inertia in order to produce momentum. The force of rotation is called torque. Torque is required in order to rotate a body. Instead of having to overcome simple inertia (weight or mass), I must now overcome angular inertia. Not only does mass resist movement but also, when you are trying to turn a body, the length of the body has an effect...
on how easy it is to turn. The longer a body is, the more difficult it becomes to turn the body. So now there are two factors that constitute the angular inertia of a body—the mass and the length of the body. There will be more angular inertia (more resistance to torque or angular force) the more mass the body contains and the longer it is when the force is applied.

Once a force (torque) of sufficient magnitude (enough to overcome the angular inertia) is applied to a body, angular momentum will be produced. The total amount of angular momentum will depend on the angular inertia (i.e., how much mass and how long the body is) and the speed (angular velocity) the body is turning. It is important to know how torque is created. Generally it is a combination of two forces (in physics terms—a force couple). For example, twisting the wrist is the use of torque. When you sit on a bench and swing your lower leg, there is torque about the knee joint because the muscles around the knee must displace the load. This is why leg extension weight machines hurt the knees so much.

It is also possible to rotate the body by applying what is called an eccentric force (i.e., a force that is not directed through the center of gravity of a body). For example, when I walk through a revolving door, I direct our push close to a right angle (90°) to the door. I do not push on the end of the door in the direction of the axis of rotation that would also be the center of weight. If I think of a circle with the axis of rotation of the door in the center, then the door would become the radius of the circle. Rather than apply a force in the direction of the radius, it applied at a right angle to the radius (tangent to the circle). Another example might be to balance a stick (not on end) in the middle of your finger. If you now push up and send the stick into the air it should not rotate (not if your finger was directly below its center of weight—the condition necessary to balance). However, if you place your finger away from the center of gravity and conduct the same experiment you will find that the stick will not only go up but will also rotate. The further away from the center that you place your finger the more rotational and less vertical effect you will have on the stick.

It is important to realize that all the angular momentum one creates is created while the body is still in contact with the ground or the apparatus, in other words, at the time of the take off. This angular momentum is a product of the angular inertia (mass and the length of the body) and the angular velocity created. Once in the air, it is impossible to create any more angular momentum.

However, when a person is in the air, free of support and rotating, it is possible to change the variables that make up angular momentum. Remember that Angular Momentum = Angular Inertia x Angular Velocity. While it is impossible to change the mass of the body while it is in the air, I can change the shape of the body at will. When I extend the body (stretched body position) it is the longest it can possibly be relative to forward, backward or sideward rotation. If the body were rotating forward then I would have the most angular inertia in a stretched body position and the least in a tucked position. While in the air rotating around a horizontal axis (somersaulting), I could increase the angular inertia (lengthen our body) in order to slow the angular velocity, or I could decrease the angular inertia (shorten our body) in order to speed up our angular velocity. One factor will decrease by the same amount that the other will increase so that the total angular momentum will never change.

**Power Theories and Physics**

Grand Master Ed Parker simplified all of these rules of physics in his writings about American Kenpo into several concise rules that are easy to explain and teach to a martial arts student.

**I. “Back up Mass: Is a result of proper body alignment. When this occurs, the weight of your body positions itself in line with, and behind of, the action rendered. For example: (1) a punch delivered when the elbow is directly in line with, as well as behind of the fist, (2) the bracing of one finger directly behind another when delivering a two finger chop, or (3) the forearm and bicep tightly pinched together when striking with the elbow.**
The following could be said of back-up mass:

A. it allows you to take full advantage of your body weight, when your body parts are in proper alignment;

B. it centralizes your body weight so that it adds to the force of your action, when your natural weapons are formed into a compact unit and travel in the same direction;

C. it reinforces the delivery of your natural weapon, when all of your body parts simultaneously move from their point of origin;

D. it places your body weight in harmony with your action, especially when the principles of directional harmony and point of origin are in perfect synchronization with each other.

II. **Torque:** It is the utilization of rotating force to position the muscles to allow for ease of movement, extension, body flow and increased power. This twisting force aids in the development of in place body momentum by actively engaging various body parts at different levels and time intervals. For example, while you are punching, the foot rotates before the hips. The hips in turn rotate with the shoulders. The fist rotates simultaneously with the hips and shoulders, but is slightly ahead of the elbow. Thus, torque comes not only at different levels and time intervals, but at various speeds as well.

Torque:

A. is a necessary step contributing to power;

B. takes place at several positions on the body to complete the action -- involves relayed body action;

C. derives power from a series of rotating body parts;

D. can be combined with other forces that help to create power gravitational marriage and body momentum;

E. may alter the effectiveness of your strikes at various depth levels; and

F. must be executed with vigor and speed.

III. **Body Momentum:** is a concept that utilizes momentum to increase power. It is the uniting of mind breath and strength while shuffling forward or in reverse with the weight of the body.

Body Momentum:

A. primarily derives its power from horizontal movement;

B. uses foot maneuvers (stance transitions) to complete your move;

C. can be combined with Gravitational Marriage to obtain even greater Power;

D. also employs the principle of “back-up-mass”; and

E. enhances horizontal and diagonal, forward and reverse speed which in turn enhances power.

IV. **Gravitational Marriage:** is a concept that utilizes gravity to increase power. It is the uniting of mind, breath and strength while dropping the weight of the body. The merging of all of the above, at the time the body drops, adds immeasurably to the force of the strike. Thus, a literal marriage with gravity occurs.
Gravitational Marriage:
A. teaches you to get the most from your body weight using gravity as an aid;
B. greatly enhances power;
C. power comes primarily from vertical movement;
D. employs the principle of "back-up-mass" where the force of the drop is backed by the weight of the mass; and
E. helps to increase vertical and diagonal downward speed which in turn contributes to power.” 22

V. **Additive Power:** is a concept that utilizes the speed and direction of the opponent to increase power. It is the uniting of the mind, breath and strength of yourself as well as your opponent to increase the power of the attack.

Additive Power:
A. greatly enhances power;
B. can be thought of as a collision. When the opponent runs into your technique;
C. employs the principle of "back-up-mass" where the force of the drop is backed by the weight of the mass; and

VI. **Centrifugal Force:** An object traveling in a circle behaves as if it is experiencing an outward force. This force, known as the centrifugal force.

Centrifugal Force:
A. depends on the mass of the object, the speed of rotation, and the distance from the center.
B. The more massive the object, the greater the force;
C. the greater the speed of the object, the greater the force;
D. and the greater the distance from the center, the greater the force.
E. You can swirl the ball around in a circle over your head while holding onto the rope. The ball experiences the so-called centrifugal force, and it is the rope that provides the force to keep in moving in the circle.

VII. **Counter Force:** The amount of force a striking implement imparts to an object depends upon the combined momentum of the implement and the object at the moment of impact.

Counter Force:
A. greatly enhances power;
B. depends on the mass and speed of the object and the mass and speed of the opposing object,
C. The more massive the objects, the greater the force;
D. employs the principle of "back-up-mass";

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E. can be combined with Gravitational Marriage to obtain even greater Power;

In practice, the more of these Power Theories you can utilize at one time, the more power you can generate with less effort. Seeing where you can utilize these in our required Il Soo Sik Dae Ryun techniques can greatly improve them in a short amount of time.

**Coordination and Timing**

**Coordinated Body Motion and the Triangle of Power**

Coordinated body movement is when you harmonize all motion, taking into account the length and mass of every muscle and limb. You must understand how this all relates to real world timing and you must make your body motions respect this concept of harmony.

The Key to power lies in the ability of the practitioner to transfer their entire weight through the strike. This involves the use of all of the physics I just discussed coordinated with the proper body movement and positioning. To best understand this, I need to discuss the **Triangle of Power**.  

"In firefighting there is an old model called the Fire Triangle. This model represents the three things that a fire needs to burn. Each side represents a key element that must be present. In this model it's heat, oxygen and fuel. If you take away any one element the triangle collapses and the fire will go out. This idea revolutionized firefighting tactics.

In the same vein, I can imagine a triangle of power for correct martial arts movement. The three elements, Body Movement, Range and Structure, must be present in order to deliver power. If an element is missing, the triangle collapses and I lose power.

All too often mistakes (or outright lack) in one of the legs of the triangle will affect others. For example, let's say you are in the wrong range for a move. For the purpose of illustration we'll say you are too far out. You will have to sacrifice structure to compensate for bad range. In order to still reach your target you will have to twist your body in a manner that it cannot deliver or withstand the delivery of that force. So now instead of jabbing him with a 2x4 you're poking him with a spring. Furthermore, because you have twisted your body or are leaning forward, you are also interjecting elements of body movement that should not be in that move. Who knows where your force is heading off now. These extra types of body movement are more likely to rob you of power, than generate.

Unfortunately, this is how most people try to fight because they were never taught the fundamentals of fighting. And this statement includes most teachers. You can't teach what you don't know.

Now many so-called "experts" will look at this model and immediately start arguing that there are many more elements involved, such as speed, timing, power, etc. It's true, these other elements are indeed involved. However another way of looking at this triangle is as if it is a three-sided corral. These three elements are what keep the "horses" of timing, speed, power, etc., inside. It is in that corral where you want them so they are useful to you. Quite frankly, many of the errors made in power delivery come from

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losing one of these "corral" elements and trying to fix the hole in the fence by trying to use a "horse" as a part of the corral fence. I cannot believe the number of times I see people trying to compensate for body movement through speed. Or how often I see people trying to compensate for lack of structure through muscle. My all time favorite though is when they try to compensate for a their lack of these elements by throwing a whirlwind of ineffective blows. That's like saying "We're losing money on every transaction, but that's okay, we'll make it up with volume of sales!"

So let's say right here and now: Those "horse" elements are inside the corral, they are not what makes the corral. Don’t ever try to make speed, muscle or timing the source of your power, because it simply is not going to work. And the more you try to “patch” the holes in your corral's fence with these elements, the more things are going to fall apart on you.

**Body Movement**

In no other topic is the "what you know ain't so" element so in effect as in Body Movement. To begin with most people are not consciously aware of how they move. This is made far, far worse by the fact that there are some misunderstandings of concepts that have become so ingrained in the martial arts world. These misunderstandings combined with not consciously knowing what their bodies are doing result in all kinds of power loss.

Let’s take the hips as the number one culprit. How many times have you heard that your hips are the source of your power?

That is not entirely true. The source of your power is your body moving in a particular direction. That is the source of your momentum (power). As we have been told, the formula for momentum is \( M=mv \)

Momentum equals mass times velocity. To start with, velocity doesn’t just mean speed, it means speed and direction. (It doesn't matter how fast you are moving if you are heading the wrong way). So if you weigh 150 pounds and your body is moving in one direction at 10 mph, you end up with a momentum of 1500 pounds per mile per hour. Now there are all kinds of little tweaks and adjustments you can do to increase that number, but they are beyond the scope of this paper. The general idea, in order to have power everything you have has to be heading where you want it to go.

Where this idea is violated is when people try to generate power from their hips alone. Someone once said "It is impossible to make something fool proof because fools are so inventive." The same can apply here. There are all kinds of ways people come up with to screw up a move with their hips. The reason they are screwing up is because they are trying to make their hips the only source of their power. While I cannot categorize all the interesting and unique ways that people move incorrectly, I can give you a few examples.

Believing that the hips are the source of power, people quite often think that if a little hip twist is good, then a whole lot must be better. The problem with this idea is that, by over twisting their hips they are actually sending their force off in another direction. Short rule of thumb, your power is going where your nipples are pointing. When people in trying to generate power from their hips, turn too much, to the point, that their bodies end up facing another direction and NOT at their opponent. This extra twist also makes it impossible to have structure if you are trying to punch straight.

In this over-done pose your structure cannot withstand the force you are generating. If you are punching, your arms will collapse like a spring. Yes it feels powerful, but the truth is this is only because your muscles are trying to compensate for your lack of structure. A proper hit, with your bones in alignment, your tendons and muscles able to lock them into place feels too easy! It feels as though nothing happened. That is because the force is not being diverted into your muscles, but channelled through your skeleton.
A second way that people commonly blow it is that they step into a stance, stop, and then try to start up again and generate force from their hips. They arrest the momentum they had by stepping into the stance and then try and make new momentum by twisting their hips. This behavior directly arises from thinking that power comes from the hips.

With these examples in mind let me give you a different perspective on the use of hips in power. They are not the source of power, they are an accelerator.

That is to say that if you are stepping at 10 mph, by twisting your hips at an additional 10 mph, you accelerate your body mass to 20 mph. This takes your force up to mass \(150\) x velocity \(20\) = Momentum \(3000\). The challenge is to move your hips only so far. Enough that you accelerate your momentum, but not so far that you divert your energy another direction. Which is unfortunately, what most people do when they try to generate power from their hips.

This is just a simple example of how important correct body movement is and why it is important to pay close attention to it in your training. There are many other things that can go wrong with how someone is moving their body especially if they are unconsciously doing it, as so often happens when people think they know how to generate power. Once you know what the correct body movement of a technique is, do not try to make it more powerful by over doing it, such an act ends up robbing you of power rather than creating more.

The subject of effective body movement is discussed more fully in depth on the Mushy Movement section of this paper.

**Range**

It’s sad to say, but Range is perhaps the most poorly understood concept in the martial arts today. That’s because Range is not just one thing, but a combination of elements. Elements that must be studied and understood individually before you effectively combine them.

First of all, any technique is designed to deliver maximum power at a certain distance. This can be best illustrated in a power spike. Too close and the move does not have time to generate enough momentum (or the structure is not developed yet). This is demonstrated by how often a punch can be foiled by stepping into it instead of trying to avoid it. While power is still delivered the amount is greatly reduced. By changing the range you destroy the punch’s effectiveness. Too far out and the momentum has been expended already. This is over and above the problem of sacrificing structure to reach your target. Attempting to do a technique on the outer reaches of its range is problematic because your power has already begun to fall off. You are on the down side of the power curve.

It is knowing the proper distance that a move is designed to work, and not attempting it outside that distance, that will do wonders for keeping you from sacrificing your structure. All too often people try to over (and under) reach to compensate for being in the wrong place.

Another key element of range is knowing what kind of attack you are generating. Targeting for different types of attacks is critical. For example, with an impact attack, your target is the imaginary pole in the center of your opponent called his “Vertical Axis, (VA)” With a punch you want to reach into his mass, touch that pole and retract. If you attempt to "punch six inches behind him" you are not hitting, you are pushing. The physics of a push are radically different than a hit. If you attempt to drive past your opponents vertical axis with a hit, either a) your structure is going to collapse and either he bulls in on and kicks your butt or you end up standing close to him wondering what to do next, or b) you will just end up pushing him back for a moment, or c) a weird combination of both that puts you right back to where you started.
Unfortunately the way most people train to hit does not teach to target the Vertical Axis. In fact, how can you learn to accurately target such a small point, when you are training to punch anywhere from six inches short of your opponent's chest to six inches behind it? That can be a distance of up to two and a half feet! Let's say for the sake of example that the VA is one inch. If your idea of where to hit is somewhere within 30 inch span, how likely is it that you will be able to hit that one inch spot with any accuracy? This is especially true if that target is moving!

A punch is not a bullet. It does not "fire hose" or "laser beam" through the vertical axis causing damage as it passes through.

Your hands cannot travel the same speed as a bullet, so therefore you must create a shock wave in your opponent's body through a different means. And that is an impact. An impact goes in, touches the VA, delivers the power and then quickly withdraws. Although your hand is slower than a bullet, it weighs more. If you are punching correctly, it will have your entire mass behind it. So you still can generate a large amount of force/shock/impact, enough to knock someone down.

Another reason that you need to withdraw is the retraction lessens the duration of the impact, which means that the power is delivered all at once, instead of over a protracted period of time, as happens with a push. The importance of this concept can be seen in the difference between falling face first onto a concrete floor and falling from the same height face first onto a soft bed. The same amount of force is being expended in both cases, but the flexibility of the bed allows for the dissipation of force over a longer period of time.

If no one has ever explained this concept to you there is no way that you can find the correct range of a move. How could you? Somewhere within that span of 30 inches was the right spot, but you didn't know where it was. But this leads to all kinds of other problems. Many people attempt to compensate for this failure by trying to generate more force. The problem with this approach is that by doing so, they usually end up using inappropriate body movement, sacrificing their structure or "patching" with speed and muscle.

**Structure**

Structure is another poorly understood concept in both martial arts and defensive tactics. And like Range, it is an umbrella term that covers a number of concepts. Among other things it is holding your body in such a way that the momentum your body movement has generated is delivered into your opponent. Sound simple?

Unfortunately, if you are not in the correct "pose" your joints tendency is to bend. This will create shock absorbers, thereby absorbing the power by turning your limbs into giant springs, It's not that you don't have power, it's that by how you are holding your body, you are robbing yourself of it. Most of your force is not going into your opponent, but rather into your own body.

Let us categorically state: *Martial arts stances were developed to create structure*. If these stances are correct, the body's own skeleton, tendons, joints and muscles will "lock into place." When this occurs your momentum will be delivered into your opponent. Having said that, however, most martial arts teachers have no idea what a correct stance is. Oh sure, they're in the general neighborhood, but the address is wrong. Like targeting for an impact, structure is a matter of inches. Hold your elbow one inch in and you have structure, hold it an inch out and you lose it.

Now, while it might sound like I just gave ammo to the constant dojo wars that inflict the martial arts (where different factions within a style, are in a constant argument over who has the "true art", this is not the case for two very real reasons. First is that there are many different stances that create structure. Often both camps are doing something, that although different, are equally effective for achieving this end. They are arguing over who is "right" instead of what works. Unfortunately, the second reason is far
more common, and that is that what both schools are doing fails to create structure. The complicating factor is that even though students of both schools are performing the move "right" (i.e. exactly how they were taught) the moves are fundamentally flawed because they do not create structure. In essence they are arguing over who is "right" when what both of them are doing doesn't work effectively.

Here is a simple test to see if you have been taught structure. Stand in front of a wall and take a stance. Now move your weight to your back foot and perform a striking technique. Do it so your fist/foot just touches the wall. Now, paying close attention to anything that squishes, shifts or is pushed back before locking down again shift your weight forward. When you do this tighten your muscles to resist.

If you have structure, you will not be able to move forward.

If you don't have structure, you will push through resistance before you reach a point where you cannot move forward anymore. This will be where your body achieves a structural pose. Sometimes this structural pose is your strike, but just as often as not it isn't. If you are not in proper structural position you are literally trying to poke him with a shock absorber. A shock absorber that is robbing you of your own power.

I mentioned earlier that an indication of striking with structure is that it feels "too easy." This is a critical concept because when your body is held to create structure, even pressing into a wall with your full weight will not feel like much of an effort. The problem with how so many people attempt to do techniques is that they feel that the moves must be hard; they have to feel like you are doing hard work. That stress and strain is not an indicator of how much force you are delivering into your opponent. It is a indicator that you are in the wrong position. It is your muscles trying to resist the physics that are threatening to collapse your limb because you don't have structure. An unfortunate consequence of this is that most people initially train themselves to hit wrong (without structure) because it feels like they are doing more than when they are doing it right.

So here is an Important Safety Tip: If it feels like you are hitting really, really hard....you're not.

Take that experiment of standing in front of the wall (or door frame for circular attacks) and begin to fiddle around with different elbow, shoulder and body positions to see how you need to hold yourself in order to create structure. You will find all kinds of little tweaks and twists that you need to do in order to create structure. These are going to be a matter of inches. Also, free safety tip, if it hurts to do, it isn't right so stop doing it. What you will find by doing this are all kinds of little problems with what you were taught.

Here's another Important Safety tip: An offensive action can be aimed at the person's ability to attack rather than an attempt to hurt the person.

An action that disrupts the person's balance, orientation on you, structure and ability to move/recover can all be done without inflicting pain. All of these are offensive actions. Actions that contribute to the over-all success of your offensive. Quite often people forget these kind of offenses, aimed at your enemies "supply lines" are critical components to victory. You don't necessarily have to crush your opponent in battle, if his "army" is unable to fight. This will be discussed more in depth in the Self Defense section of this paper.

Unfortunately, most people attempt to go into a situation with the assumption that they must crush their opponent. In doing this, they condemn themselves to a wildly ineffective strategy, increase their chances of being hurt and extend the duration of the conflict. The reason this is the case, is that they commonly attempt to use only one attack strategy, usually hitting. The problem with this is that because of their limited offensive options, their inability to move effectively and the incredible power loss that most people have because they don't understand range/structure/body movement They don't move as fast as
they think they are moving, they are, in fact, wasting about two thirds of their actions. Yes, I just said they are doing about three times the amount of work that they need to do.

The complication that arises from all this extra and unnecessary movement is that any advantage that they gain by their one successful move is lost while they fumble around with the next two ineffective moves. Yes, they create shock and disruption in their opponent with a successful move. But while they are out there preparing for their next offensive, they give him time to recoup and probably launch his own counter offensive. This is why most “fights” devolve into endurance contests to see who can both dish out and soak up more punishment.

Every attack that you can think of can, and will, be either a pure form or a combined form of the following six basic approaches to offense; Impact, Drives, Compression, Pulls, Twists and Take Downs. Furthermore, even the six themselves are unique combinations of each other. For example a compression attack is commonly a drive, but very specifically a drive into a base. In fact, if you want to break it down into the most basic, all of these can be broken into specific variations of push/pull.

Let’s start with the two most common, and most commonly confused types of attacks: Impacts and Drives.

Impact: As explained earlier an impact is an action that delivers force into your opponent’s vertical axis. You literally reach into his body mass, touch the VA and retract quickly to deliver your force into his body and create an internal shockwave. This is like dropping a large rock into a pool, the waves/ripples travel through the water until they reach the side of the pool and then they rebound back in. Understanding this internal, multidirectional shock wave is critical to knowing how to deliver an effective impact.

Drives: Are actions that go beyond your opponent’s VA. They are in essence pushes, but a sword thrust or bullet are also drives. In empty handed work, they can be used to break/cut/tilt your opponent’s vertical axis or spin him around it (twisting). Where an impact would rock someone’s head with the shock, a drive would push it to where you want it to be. Drives have a very strong tactical application for moving your opponent into position as a set up for your next, more powerful move (e.g. instead of you moving, you can push him into your hitting range). They also have strong application in disrupting your opponent’s structure so he must spend the next moment regaining his balance/orientation instead of attacking. The use of the ZONE THEORIES discussed later in this paper play a big part in this.

It is important to realize that your opponent’s limbs also have axis’s as well. Most limb breaking or sweeping actions are not impacts, but instead drives. You literally try to chop the legs out from under your opponent with certain kinds of kicks. While you can hit the attack with more of a parrying move, which is based on a fast slap against an incoming fast blow to deflect it, a parry should not change the axis of the opponent. This concept is often misconstrued by people who try to turn their blocks into hits. Don’t try to hit with your blocks, it most often only results in you being too far out to block your opponent’s next attack. The reason for this is that most of the time “hitting” with your block is an attempt to compensate for poor structure with a drive. The only way a flawed block has a chance to work is if you push the attacking limb far away. That unfortunately, takes you out of position to effectively respond to the next blow.

Compression: These kind of attacks commonly trap your opponent between a force and a base. The utilization of a base doesn’t increase the force as much as it does not allow for the person to shed, roll with or bleed off the energy. Slamming someone into a wall and pinning them there is a compression attack. But, so is a chokehold, the forearm applies a constant pressure while the chest and bicep provide a base to keep the person from squirting out of the applied pressure. Although drives are commonly used in combination with a base, pulls can often be used as the base that pins your opponent for an impact as well. An example of such a move would be pulling/pushing an opponent into an elbow strike or a double handed ear slap. Compression attacks come in many forms, and although they are
commonly associated with grappling, their absence in striking arts is because of safety reasons. A properly angled strike traps the person between the impact and the earth.

Furthermore, compression attacks also involve leverage. This is especially true in throwing arts where you push/pull your opponent over a base such as you hip, thigh or foot. Just because you are pushing/pulling doesn't mean it has to be into the base, you can drag/push him over one.

**Pulls:** Are again a commonly lost element within most sport striking arts. The reason is simple, sucking someone into an elbow strike tends to create major damage. However, those arts that still retain them use them with great effectiveness. Pulling moves are often used to disrupt your opponent's structure so that he must spend the next second attempting to regain his balance instead of attacking you. In the mean time you continue to attack. Pulls are also commonly applied to move your opponent into position for your next move while simultaneously twisting his body along his vertical axis so he is not directly facing you.

**Twists:** Are any action that manipulates your opponent into a position that you desire, but he doesn't. Twists can be either drives, pulls or a combination of both. An example of the last would be pushing one shoulder, while pulling another to twist your opponent 90 degrees so you can close in behind him. Joint locks are another form of twisting attacks, especially ones that result in "voluntary throws" (where your opponent throws himself such as in Small Circle Jujitsu).

**Takedowns:** Come in two basic forms, throws or takedowns. A throw is where sufficient force is applied that your opponent is thrown so as not to be able to counter and re-establish his base. Whether this means you pick him up and toss him (involuntary) or he tosses himself (voluntary) doesn’t matter, they are both throws. A takedown, works on similar principles but with less force. A takedown is akin to taking two legs out from under a table. The table falls to the ground. Unfortunately for him, your opponent is the table. Both throws and takedowns are based in meeting two basic criteria:

1. Disrupt his balance/structure
2. Counter his attempts to get it back

**Use of the Power Triangle in Basic Techniques**

**Analysis/self-correction**

The reason knowing the power triangle is important is that these are the standards that you can use to analyze your techniques. This is recommended because doing so will not only assist you in learning them better, faster and more effectively, but will also make you more effective in doing them.

Along with self analysis, there needs to be an understanding of the following in order to understand and then explain your basic techniques, and then how this all applies to self defense.

**Angles** As you saw earlier when studying the Universal Pattern, understanding slight directional changes in how you are applying force has a major effect on how much work you have to do and how effective you are. Learning how to correctly use angles is a critical step in improving how effective you are and if your opponent can keep on resisting you. It is also vitally important in understanding how to avoid the attacks from your opponent and in how to gain his balance.

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Application The sad truth is that most of what is explained as the uses of moves from forms simply does not work. That does not, however, mean that the move cannot work. Practice and intent study will bring out hidden techniques that may have been lost over the years.

Basics vs. Fundamentals Many people do not understand that although very close in meaning there is a difference between these two terms. A difference, that if you do not consciously address, critical components will be lost from instruction. Unfortunately, most people neither know or address these differences and by doing so rob themselves and their students of effectiveness. A beginning student can perform a high block. Understanding the fundamental use of the arm, wrist position, twisting of the hips and driving from the legs, the turning of the shoulders and elbow, and doing all of this in the proper sequence is where you gain insight and power into the techniques.

Distance Where you are standing has major influence on whether a technique is going to work or not. Notice I didn’t say ‘whether or not you can do the technique’ I said whether it is going to work or not. Unfortunately many people try to make a technique work from the wrong distance, in doing so they rob themselves of power and effectiveness. The importance of range will help you understand why so often things aren't working

Effective Movement The importance of effective movement cannot be understated, it is a fundamental. Unfortunately, it is a fundamental that’s significance has been lost to many people including most instructors.

Finding a Techniques Optimum Range Now that you know distance/range is so important for power delivery how do you find it for a particular technique? Practice!

Unnecessary Movement There is a BIG difference between what generates power and what you think generates power. Unfortunately, what you think makes for a powerful move plays way too big of a part in how you move. Many people, in attempting to add in more power actually are robbing themselves of power by putting in extra and unnecessary movement. See the section on Mushy Movement later in this paper.”

When Punching

“The key to any martial arts power lies in the ability of the practitioner to transfer their entire weight through a strike. Stay relaxed. A relaxed body is a fast body. Contrary to popular belief, a punch starts not with the hand not with the hip but with the legs. The hip needs to stay relaxed and start by pressing down on the floor with the foot and contracting the knee and leg muscles. Which foot depends upon which hand is doing the punch. The punch should go up the center line keeping the elbow close to the side of the body until it rotates as part of the wrist rotation. All of the upper body technique should be performed so that the elbows and hands remain inside of the shoulders. (See Picture on the left) The farther your elbows of hands extend beyond these lines, the weaker they become. If your elbows jut out beyond these lines you will not be able to strike or perform any upper

19 Lee, Bruce. Tao of Jeet Kune Do. Valencia: Black Belt Communications LLC, 1975. 94 Print

body technique with full body power. Your torso should rotate as part of the hip rotation but be sure to keep your torso vertical as there is a natural tendency to lean to the side or forward, or “wing” the elbow out away from the body. The shoulders follow through next pulling the elbow which then throws the hand out to the target.

Another reason for the twisting of the wrist is to create a relaxed tension which creates penetration into the target. This creates enough **Time on Target** to create a **Fluid Shock Wave**. In the time of about a tenth of a second, the kinetic energy of the strike can create a shock wave that travels into the affected tissue and causes maximum damage. It is imperative that all strikes to vital points and nerve motor points are delivered with this principle in mind.

### Chambering

The use of counter force is essential in order to help in the gaining of speed and mass. The contraction of the arms, legs, and abdomen need to be in sync so that there is a sudden tension and then relaxation when throwing the punch.

When the punching arm is bent so that the punching fist is initially chambered at the level of the nipple or upper chest, the punching elbow is placed below the level of the fist and the shoulder is slightly raised, the pectoral muscle is isolated. *(See picture on the right).* 27 This restricts the punch to using only the strength of the single pectoral muscle rather than the larger and stronger abdominal muscles. Because the elbow is held on a plane lower than the fist, the force of the thrust cannot travel from the shoulder through the elbow and the elbow is unable to push through the fist. Instead the power bypasses the elbow and travels directly from the shoulder to the fist, resulting in a loss of striking power.

Chambering the fist at the hip or at the level of the waist places the elbow on a plane above the fist. This allows the shoulder to push through the elbow and the elbow to push through the fist. The pectoral muscles are not isolated and more of the body’s mass can be brought into play, thereby increasing the power of the thrust.28

### When Blocking

“The purpose of a block is “not to get hit.” By simply standing in front of the mirror and practicing these different blocks you will see the “errors” I am talking about. Don’t “look at the block,” instead “look at your body “through the block.” See if your block “covers” your body. By doing it this way you will see where you are exposing yourself with how you are doing the move. If your block doesn’t “sweep” over your body, that is where you will get hit.” 29

Blocking is a lot like punching. The coordination of the body movements are in the same order, but the position of the arm for the most part is different. Many times, the elbow is bent to create larger surface area and thus margin of error when blocking or giving the block a chance to angle and deflect the attack.

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The elbow is also bent into an angle at 45 or 90 degrees relative to the bicep muscle giving it a strong position that I will discuss shortly. In order to gain additional speed and involve more muscles in the techniques, twisting the wrist into the final position. This is the same as twisting the wrist at the end of a punch. It is also important to make sure that the bones of the forearm are lined up together at the point of the block. The contraction of the muscles also help to line up the bones and reinforce them creating a strong block.

At an angle of 90 degrees, the elbow joint has strength gathered from both the bicep and tricep muscles. (See picture at right)\textsuperscript{30} At this point the joint is able to generate power and resist force. If the elbow is bent to 45 degrees, it creates a powerful triangle thus making it able to resist force against it, but you have now totally given up the ability to generate force and perform any type of punch. This is why boxers use this bent elbow technique when they cover the head against any type of head punch. But in the martial arts, one does not usually commit one technique to totally blocking like this. Having the elbow at 90 degrees presents us with a very strong arm position for blocking, one that is able to resist both pushing and pulling, gives us a large surface area to use for blocking, and lets us generate power from our lower body.

The Circle and the Line

In the martial arts, different schools stress linear motion while others stress circular motion. According to studies in kinetic energy, the greater the centrifugal force present the greater the distance the circumference of a circle is from the center. Therefore we should think of the hips as the center of a circle and perform punches and blocks as though outlining the circumference of a large circle.

In actual self defense, there is a time and place for both. When being attacked with a linear technique such as a straight punch, the best block is a circular one. Thus the converse is also true, when being attacked with a circular punch such as a hook punch, a linear block such as an elbow block will do the job just fine.

The misnomer is that even though there is such a thing as a linear block, the only way to get power into the block is to use the circles generated from the movements of your hips and shoulders. Linear techniques are never straight linear. There are circles in our stances, arm movements, leg and hip movements, etc. A microscopic study of each technique will reveal more every time you look.

When Kicking

When a student is just starting out in the martial arts, they may walk into a dojang and be amazed by what appears to be lightening fast kicks by the advanced belts in class. The prospective student will on any given day see spinning kicks, hook kicks, crescent kicks and even flying kicks. That is hard to fathom by many beginners is that almost all of the advanced kicks are spin offs of one of the four basic kicks that a white belt is taught. These basic kicks, the front kick, the side kick, the round house kick and the spinning back kick are the corner stone of all of the kicks taught in the martial arts. Every martial art taught in the world has these basics, or variations of them that are taught to all beginning students.

In Tang Soo Do, the upper body should remain as straight and in an upright position as possible both before and after the kick is performed. The supporting leg should have the knee slightly bent for better

\textsuperscript{30} Fight Science Images, \texttt{<http://www.bodyworksfitness.wordpress.com>},

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balance and to help absorb the shock at the moment of impact. Also by having the support leg bent, you are able to contract the muscles and generate more power. After executing the kick, the leg should be pulled back quickly in order to prepare for the next move and to prevent the opponent from grabbing it. This also helps in keeping your balance. Always focus on the target and make sure you can see it prior to executing the kick.

All of the kicks take an immense amount of practice to be able to execute them properly and with power so don’t let the students get discouraged while training. If they have trouble keeping their balance or reaching the height you desire, have them be sure that the knee of the support leg is slightly bent even through the kick. After that, examine the sequence and timing of the kick.

**Front Kick**

In Traditional Tang Soo Do Volume II the performance of the front kick is described as from a left hu kul ja seh, "Shift the weight to the left leg while bending the right knee and bringing the leg forward and up, so the knee points at the target. Curl the toes back, lock the ankle forward and tense the instep, as you extend the leg forward until the knee is locked straight out. Hit the target with the ball of the foot."

Using the various ways I have described to generate power already in this paper, I would like to add to this description. When shifting the weight to the left leg, pivot on the ball of the left foot as you place the foot on the ground. This should twist the hips forward to help generate torque and power into the kick. Keep the right leg relaxed and concentrate on pulling the knee up as high as possible straight up from the ground in a line with your right eye, contracting the muscles in the right leg at the precise moment of impact. There should also be a contraction of the abdominal muscles generated as part of the Ki Hap.

**Round house Kick**

Again quoting from Traditional Tang Soo Do Volume II the performance of the round house kick is described as from a left hu kul ja seh, “Shift the weight to the left leg while pivoting 45 degrees to the left and, simultaneously, bending the right knee, lifting the right leg up to the side so the entire leg is waist level, parallel to the floor, and the knee points at the target. Pivot the left leg approximately 90 degrees to the left while extending the right leg and kicking at the target in a circular motion. Strike with the ball of the foot. While kicking, twist the right hip in the direction of the kick to reinforce the strike. Be careful to maintain control of the kick. Stop the foot at the center line. Do not allow the momentum from a kick to spin your entire body past the center line.

I would like to add the following descriptions to the ones above to further explain how to generate more power. When shifting the weight to the left leg, pivot on the ball of the left foot as you place the foot on the ground. This should twist the hips forward to help generate torque and power into the kick. Keep the right leg relaxed and concentrate on pulling the knee up as high as possible straight up from the ground. Your upper body may still be facing mostly forwards as the right leg is pulled up from the ground. Your hips may be turned to a 45 degree angle relative to the ground as the right leg comes up parallel to the ground. Pivot the left leg approximately 90 degrees to the left while extending the right leg. The heel of the left foot should be pointing at the target as you complete the kick. The right knee should be pointing slightly past the target before the kick is executed. At the time when the foot hits the target, your hips should be perpendicular to the ground with the front of your hips facing left. Your upper body should recoil back to the right generating counter force for the kick. The right leg should stay relaxed all the way through the kick until the point of impact. At that time the right leg as well as the left leg should contract helping to generate power. There should also be a contraction of the abdominal muscles generated as part of the Ki Hap.

**Side Kick**
Traditional Tang Soo Do Volume II describes the performance of the side kick as from a left hu kul ja seh, “Shift the weight to the left leg while pivoting 90 degrees to the left and, simultaneously, bending the right knee and lifting it up to waist level so the thigh is parallel with the ground. Cock the arch of the right foot inward, toward the supporting knee, and curl the toes backward, preparing the foot to attack with either the knife edge or the edge of the heel. Kick the right leg forward, to the target, while pivoting the support leg comfortably to the left. Strike with the knife edge of the of the edge of the heel.

I would like to add the following descriptions to the ones above to further explain how to generate more power. When shifting the weight to the left leg, pivot on the ball of the left foot until the foot is at 90 degrees relative to the front, as you place the heel of the foot on the ground. This should twist the hips forward to help generate torque and power into the kick. Keep the right leg relaxed and concentrate on pulling the knee up as high as possible straight up from the ground. Your upper body may be facing sideways as the right leg is pulled up from the ground. Your hips may be turned to a 90 degree angle relative to the front as the right leg comes up parallel to the ground. Pivot the left leg approximately 90 degrees to the left while extending the right leg. The heel of the left foot should be pointing at the target as you complete the kick. The right knee should go in a line from the front of your hips or chest to the target in order to generate momentum and force. At the time when the foot hits the target, your hips should be perpendicular to the ground with the front of your hips facing left. The right leg should stay relaxed all the way through the kick until the point of impact. At that time the right leg as well as the left leg should contract helping to generate power. There should also be a contraction of the abdominal muscles generated as part of the Ki Hap.

**Spinning Back Kick**

Once again, Traditional Tang Soo Do Volume II describes the performance of the spinning back kick as from a left hu kul ja seh, “Pivot to the right so your back faces the opponent. Keep the opponent in sight by peering over the right shoulder. While turning, shift the weight to the left leg and lift the right knee up in front, waist level with the foot bent sharply upward so the heel has maximum exposure. Turn the right hip slightly toward the back as you kick straight back into the target. Hit with the heel.

I would like to add the following descriptions to the ones above to further explain how to generate more power. When shifting the weight to the left leg, pivot on the ball of the left foot until the heel is facing the opponent, as you place the heel of the foot on the ground. This should twist the hips clockwise to help generate torque and power into the kick. Keep the right leg relaxed and concentrate on pulling the knee up as high as possible straight up from the ground. Your upper body should be facing straight back as the right leg is pulled up from the ground. You should pull your right foot towards your left foot into a cat stance in an attempt to keep your spine erect. At the time when the foot hits the target, your hips should be perpendicular to the ground with the front of your hips facing slightly right. The right leg should stay relaxed all the way through the kick until the point of impact. At that time the right leg as well as the left leg should contract helping to generate power. There should also be a contraction of the abdominal muscles generated as part of the Ki Hap.

With all of the kicks, you will want to keep your arms close to your body not only for guarding the body but also for balance. The weight of your body should not be on the heels or the balls of your feet or you could lose your balance when the reaction force of your kick comes back through your body and down through your driving foot. Your weight has to be settled into the centers of the soles of your feet.

**Mushy Body Movement**

The challenge as we progress in the martial arts, is not how to generate more force, the challenge is how not to waste the force you are already generating. Unfortunately, many people by not understanding the

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significance of their system’s movement fail at this challenge. Worse, many martial artists in trying to solve this problem, by cross training end up creating more problems. Over and above the tendency to incorrectly move within their own system, quite often, cross trained individuals end up attempting to execute moves from other systems based on their original style’s body mechanics. This results in additional loss of power.

Categorically, it is the effective body movement of any system that is what makes it work.

Let me put that in simple terms: It’s NOT the style that has power. It’s how well they can teach you to move in a way to generate power. If you’re not moving in a way to generate power, then all you are doing is sticking your fist out in the air. And if you aren’t being taught how to deliver that power, then you’re throwing it away.

This is why you should always pay close attention to issues like footwork, body movement and body pose. These issues are the meat and potatoes of a system, they are what makes it work. Unfortunately, an emphasis on hand work, kicks and combinations often eclipse these aspects because the former look far more impressive and flashy. The emphasis that is paid to these power generating elements is one of the standards by which you can judge the effectiveness of either a system or a teacher. The less emphasis, the less effective.

Physics in Training

First Concept: Different martial arts styles use different body movement systems to generate force.

Simply stated, certain "tools" (hand positions, strikes, kicks, etc) work best with specific kinds of body movement. Bruce Lee was wrong "a punch is not just a punch." Particular punches are designed to work with specific body movements. A kung fu "hanging punch" does not operate with the same body mechanics as a boxing hook. Usually, a martial art style will have tools that are most effective with the specific body movement that the style employs. Having said this three related points arise.

A) One of the biggest shortcomings of many commercial martial art schools is their failure to understand the tool/body movement point. They commonly have a single (or limited) body movement formula that they attempt to hang all their moves off (e.g. turning the hips). The physics of what they are doing is different than what creates optimum power with those tools. Because they do not know the tool/body movement connection they cannot effectively teach it. As such instructors allow their students to "patch" what they are doing with other types of movement; usually with what the student thinks creates power. These extras violate the tool/body movement connection and, in fact, rob the student of power instead of increasing it. The student doesn’t realize this because it feels oh-so-powerful to him/her. Yes, there is a lot of energy being created, but where is it going? Most of it is being scattered to the winds, however, quite often a great deal is going back into the student’s own body. Which is what gives the student the perception of great force. The problem is the force is going into them and not where they want it to go.

When these students become instructors, the elements of correct body movement in relationship to tools is lost. These people cannot teach what they never knew. Nor can they correctly identify which movements their students are doing that are power generating as opposed to power robbing. Therefore, this lack of understanding regarding power generation is passed on from instructor to instructor. This brings us to the next point.

B) Quite often, having seen this degeneration of power in the system, the head instructor brings in body movement from other systems in order to “patch” the system (e.g. introducing boxing elements into a karate system). Instead of strengthening the system, it often results in further weakening of it. This from not understanding the tool/body movement relation, and again, trying to hang all the tools off either the same movement or variations thereof.
C) One of the biggest failings of cross training is when someone from one style attempts to apply his original body mechanics to the moves of a different system. This is why you will so often see what I call "wing chun flavored karate" or "silat flavored FMA" instead of "pure" Wing Chun or Silat. The body mechanics of these different arts are radically different. But what you will often see with people who claim to be able to teach you multiple styles is the body movement of their original art mixed with the handwork/tools of secondary arts.

When any of these points occur, you get "mush." You end up with movement that has neither the power nor the structure of either pure form.

Having said all this, while it is possible to effectively cross train, and it is also possible to bring in body movement from other styles, great care and attention must be paid to maintaining clean body movement for the tool being applied. Failure to do so will result in mush.

Second Concept: Different bodies move differently. There are certain moves that some people just can't do. Their body just doesn't work that way. Your body might not work with how a martial art system creates force.

This is why it is advisable for a beginning/intermediate student to find a system that works well with how your body works. You will learn such an art easier and faster than one that forces you to move in a manner different than how your body normally works. If however, you are in a profession that you need to apply physical force, finding a system/training that immediately works with your body mechanics is critical. Don’t waste time learning things that, while they may work for others, don’t work for you. For advanced students in the martial arts, it is advisable to seek training, not in similar systems that you are proficient at, but in systems that have radically different body movement than what you are proficient at. You're not growing as a martial artist if despite having several rankings, they are basically all the same body movement system.

Third Concept: is there is no ONE ULTIMATE WAY of generating force. Any system that contains an understanding of body movement, structure and range can knock you into next week. What's more is that each of these different types of pure body movement creates different sets of physics, angles and force. Three interesting points arise from this single fact.

A) No one form of power generation is all encompassing. Situations arise where you need to be able to shift to a different means of generating power (ergo the need for cross training).

B) When it comes to blocking, these small, subtle, but important differences in how each way creates force are often enough to create an over-specialization within a style. Specializations that work to stop the attacks practiced within that style, but leave the student vulnerable to attacks from different styles.

C) Much of the argument over which type of movement is Right vs. Wrong is, in fact, over the mush that results when they are badly blended.

The preceding section was just to acquaint you with the playing field. To get you up to speed on some of the issues that can and will affect your ability to generate/receive force. Now let's look at what you must be aware of to create effective body movement.

Kinesthetic Awareness/Physical IQ

Those who are fixated on the combat/self-defense application of their training or who are deeply involved with hardcore sport systems will probably not have the experience of teaching martial arts to children. Which is a pity because it is through teaching children that we realized the fundamental flaw that people are doing to rob themselves of power when they move.
If, as an instructor you tell a child to do one move only, the child will usually do about sixteen. If you tell a child to move into a particular pose, instead of simply moving into the stance, that child’s body will go all over the board. The pose that the child ends up will only vaguely resemble what you are trying to teach him/her. And then the child will look at you in complete earnestness and say “I did what you told me to do” The child truly believes that he/she only did one move and is in the position he/she is supposed to be in.

The reason this happens is a child’s kinesthetic awareness is slim to none. In short, children really don’t know where their body is in time and space. The parts are going all over everywhere. This is also why so often when you tell a child to be careful and they still drop something they protest that they were being careful. As far as their kinesthetic developmental level allows, they were. This also explains why during growth spurts children and teens become more klutzy. Their bodies have changed size and their kinesthetic awareness has not adapted to the changes yet.

The theory that there is such a thing as "physical IQ" can be summed up as knowing where your body is in relation to your surroundings and how you must reposition it to get something done. If this model is valid, then Michael Jordan would have been the equivalent of Einstein in kinesthetic awareness and spatial relationships. (Which might explain why nobody could catch him on the basketball court). In any case, children do not understand where their bodies are, as they are slowly developing physical IQ. Which explains why when you tell them to do one thing they go all over the board.

Most adults however, do not do these fifteen extra movements that scatter their focused energy in sixteen different directions. No, they only move in five different directions at once. And they too, like children will look at you and in complete sincerity tell you that they only moved one way. Now whether you call this Physical IQ or kinesthetic awareness doesn’t matter, both models work to explain the problem.

And that problem is that we are so accustomed to moving in certain ways that we must retrain ourselves to move a different way. What complicates this is that we are so ingrained how we move, we do not tend to pay attention to moving at all. Kinesthetic awareness has often been shunted aside in these autopilot movements. How we move has become as ingrained and unconscious as breathing. When we try to move a different way, our auto-pilot program kicks in and tries to run the show.

That is where the conflict in movement starts to occur. Moving differently than you are accustomed to creates a) mental duress and b) forces us to focus on what is ordinarily an autopilot program.

I have a series of demonstrations that I do to illustrate these point during seminars, but I can give you an idea of what I am talking about right now. Most people when they put on a belt have developed a habitual way of doing it. For example you go around the left side first, around your back and then around your right side and then buckle. Now try this: Stand up and take off your belt. Put it on again, but "backwards." If you ordinarily go around the left, take it around your right first. If you habitually go right, go left this time. Before you read any further, try this experiment.

If you are like most people who operate on autopilot, putting your belt on this way should just feel wrong. There is no logical/rational reason why part of you should believe that putting on your belt this way is wrong. What there is however, is an interruption of a habitual pattern of movement. A pattern that is so ingrained that you no longer have to think about doing.

Delving into training people (or yourself) into moving differently than you are accustomed to is a difficult enough task by itself. Being aware of what your body is actually doing when you are so used to it being on autopilot makes it even more difficult. This is because whenever you take your attention off that to focus on some detail, you will most often unconsciously revert to your old way of moving.

**Single/Combined/Sequential body movement**
The following model is what can be used to get students:

A. aware of their body movement
B. to isolate it, and
C. to control it.

There are three fundamental types of body movement.

1) **Singular** - This means motion in only one direction. An example of a single move is stepping forward. This kind of movement creates force in only one direction.

2) **Combined** - This means two or more distinct motions being performed at once. An example of a combined movement would be turning and kneeling at the same time. This creates a combined force.

3) **Sequential** - This is often confused with Combined body movement, but it is not! Sequential body movement is when you connect singular movements together. An example would be stepping forward and turning. This kind of movement creates a series of forces.

It is critical to realize the difference between Combined and Sequential movement. Combined is a blended movement. Where as Sequential movement is like links in a chain, each link is individual and distinct, but is interconnected with another. You will find that many of the problems that arise from generating force during a technique arise from not understanding these elements. Many students will attempt to do a combined movement when they should be doing a sequential one.

For example, let’s take the common formula for a throw: Enter, Break, Throw. Under this model you would be talking about a set of sequential movements with a combined movement at the end. With a forward step (single movement) you enter into range. With a turn (single move performed sequentially) you break his balance. Then, still performed sequentially, you do a combined movement (continue the turn and bend/kneel). Those are three very distinct motions performed sequentially. What there is not however, is a pause between these movements, which is why the chain analogy is good. The energy and results of one movement segues into the next.

However, what you will commonly see is a beginning student attempting to do all three at once. An example is the student will be turning while stepping forward. This causes the force generated by the turn to be shot out into space, because the student is in the wrong range. Furthermore, any force generated by the forward step (that could have been used to break the opponents balance) is also dragged off target and off into space. When the student tries to complete the turn and kneel, he is going to end up dangling off the gi of the person he was trying to throw.

The problem that many students have is that their autopilot way of movement is quite often a long sequential chain of combined body movements. This is why in training the first thing I focus on is teaching the person to isolate and perform a single movement. While it may seem remedially simple, a great many people have difficulty moving in only one direction at a time. But until you can isolate individual movement, the chances of you quickly learning how to effectively combine them, much less perform them sequentially is almost nil. Furthermore, this training increases kinesthetic awareness.

However, the best thing this model does is that it gives the instructor a fast, concise way to communicate to the student what is going wrong with the technique. At a glance the instructor can spot and then communicate with established terms why the move isn’t working. Being able to say "It’s sequential, you’re doing combined" speeds up student’s learning time and cuts down instructor’s explaining time.

The problem with using muscle isn’t that it is a false signal, but rather that it is like calling yourself on your cell phone from your land line. You’re in a closed loop. Most people when they feel the most force...
don’t realize the reason. They feel like they are generating so much power, when in fact it is all going into them, not into their opponent. What they are feeling is their muscles straining to keep their arms and legs from collapsing (from being in the wrong position). The momentum that their body movement is generating is too much for how they are holding their limbs. It requires them tightening their muscle to keep the limb from collapsing. That is why it feels so powerful, when in fact very little force is actually being delivered into your opponent.

It is in this feedback loop that most problems about using muscle have their root. This is because we expect fighting to be hard work! Like Civil War doctors who saw so many wounds fester that they assumed puss was part of the healing process, so if it wasn’t there, they’d put it on the patient from another patient, people assume that delivering force into others must be hard work. And if it feels to easy they will adjust their position to make it feel "right."

What they have done by doing this is destroyed their structure. A structure that would have allowed all the force to go into their opponent instead of into them. What they are now trying to do is maintain structure through muscle. This is like throwing away the paddle and trying to row a canoe with your hands so you can feel to make sure that you are moving through the water.

Proper structure is like walking. When I walk, I generate an incredible amount of force. However, because of skeletal alignment, I feel very little. Our muscles work with the structure, not to absorb the force, but to create the movement. As such, the most powerful blows do not feel very hard at all. Because the structure is bearing the load, not your muscles.

This assumption that it must be hard work creates all kinds of problems, from failing to find the correct position, failing to use leverage and many others. An in depth study of this is way beyond the scope of this page to address them all, but I will look at one of the most common ones: That of Impact. Now this can come in three very basic forms:

1) Muscles too tight through out the whole move
2) Muscles loose through the move until tightening at the end
3) Muscles must have a base to work from

The first is obviously a problem because tight muscles are slow muscles. Trying to move fast with tight muscles is like trying to run through chest deep snow. The resistance gets in the way of speed.

The second is not immediately obvious as a problem. That is until you go back and realize why people tighten their muscles in the first place. That is to compensate for poor structure. So now the person can run really, really fast up to the snow bank and then jump in. Although the idea of tightening your muscles around your structure to deliver force is a legitimate, in fact, critical component of power delivery, the way most people do it is the absolute worst combo of patching with both speed and muscle.

Bottom line, it doesn't matter how fast you snake your hand out before you tighten your muscles, what matters is that your body mass is behind the move and that you have your structure in place to deliver your momentum. Unfortunately the way most people do this "relax and then tighten" fails on both counts. Which is why just stepping forward into their punch not only destroys any degree of effectiveness on their part, but also puts you in position to drop them like a prom dress.

The third is what I call a Jambalya issue. That means it has all kinds of things thrown into one big pot. Let's restate the basic premise: Muscles need a base to operate from.

You can take the strongest man on this planet and if you put him floating out in space, he's helpless. All of his strength has nothing to push off against. In a similar vein, if you watch a powerlifter do a snatch and jerk it is an incredibly impressive feat. My point is that his feet give him a solid base and connection to the floor to do the move from. Do you think he could do the same while standing on his head?
Obviously not. His head, serving as a monopod would not be able to stabilize him nor would his neck be able handle the force.

Knowing this is important because in order to use muscle you must take a rooted stance. That means you arrest your momentum. This means you have just cut your ability to generate force by at least 2/3s, if not 3/4s. From this rooted stance you have limited body movement options. No matter how strong you are, you can only move so far in any particular direction. Eventually something has got to change in order for you to move further. And then it isn’t moving in a way to generate force, but rather only in a way that will allow you to continue to use muscle.

As I mentioned before in this paper, there is no one way to generate force through the ultimate body movement. Any effective body movement is going to generate power. But what often happens is students unwittingly attempt to combine their autopilot movement or what they think is movement that will generate great power into the proper body movement. This creates mush. That is to say a set of physics that is neither one or the other.

I’ve waited until now to mention another problem of mushy body movement. Since these mushy movements are not effective, they often end up stalling out when they meet resistance. I cannot tell you how many people I have seen whom, the energy of their technique stalled out and left them standing face to face with a very irritated opponent. Now, instead of the situation being over because their move effectively delivered power, they have a fight on their hands. And from there on, who is going to win becomes a matter of who can take more punishment.

Therefore, in your training pay close attention to the body mechanics of what you are attempting to do. You do not gain more power by throwing more and more movement into your techniques. What motion you do have there should all be directed towards the same target. For example, to generate extra power from you hips, you do not need to turn you hips to the 45, much less the 90. Such an action causes your body’s momentum to go spinning of in another direction than where you want it directed. A small motion of mere inches, is enough to accelerate your mass that much more while still keeping on target.

**Breathing**

“One of the steps if you are going to make your martial art moves become significant, is to work on your breathing. Breathing should be relaxed, but intent upon keeping the abdomen taut, especially upon striking, or getting struck. Breathing simply for the sake of breathing must be inspected for real function, and possibly altered if you are going to have real martial arts self defense.” 32 “Correct breathing strengthens certain muscle connections that run between the upper and lower body. This allows us to utilized the strength and mass of the entire body rather than just the power of the individual limb.” 33

Through timed breathing, you can attain the spiritual unification and internal power in the martial arts known as Ki.

“One area in the martial arts where proper breathing is displayed is in executing the Kiai or Yell. When employing the Kiai, the breath is held and compressed to provide internal power for a very short period. Optimum power is available while the breath is retained and by controlling the air that is expelled. Maximum effect stems from unifying all power sources. Mind, breath and strength must culminate simultaneously. Therefore, when one Kiais in the proper manner, he instantly releases the compressed air within him (measured in terms of a fraction of a second) and simultaneously utilizes his mental


powers and physical strength. Thus, proper synchronization of the above ingredients achieves power beyond the realm of normal execution.”

**Self Defense**

Putting all of this together, we now have the tools needed to start to understand a better way to perform our required Il Soo Sik Dae Ryun techniques, as well as control ourself and our opponent in any self defense situation.

To understand effective movement all you have to do is look at what every shot a good pool player takes creates. Not only will he sink a ball (that gives him another shot), but every time he does that, he sets up his next shot. The cue ball will roll to a position where his next shot will be simple. Because it is simple, he can focus on setting up the shot after that. And so on and so on. If he can't sink a ball, then he positions the cue ball so you don't have a shot. After you miss, control of the table returns to him. Meeting these standards is how a pool shark "runs the table."

Effective movement allows you to run the table in a physical conflict. Like the pool shark, every move is oriented on you retaining the control of the situation.

Here is a standard of effective offense every move you do needs to meet three fundamental standards. These are:

1) It secures your perimeter (keeps you covered)
2) Disrupts his ability to attack you (stuns him, unbalances him, changes his orientation, undermines what he needs in order to attack you
3) Sets up your next move.

Once you gain the advantage, you not only don't let him get it back, you take away his ability to resist.

If your moves do not meet these standards, you are not being effective. And by not being effective, you are not removing either his Ability or Will to attack/resist. For every second that you do not meet these standards, he will be able to attack you. And that means the situation is going to become a fight, there will be more pain and work, and while you’re going to get hurt anyway, the chances of severe injury go up every second it lasts.

That’s why it’s so important to end the conflict part in three moves or less The problem with this is that most people have no idea how to do this. Despite their claims sports based martial arts are not capable of achieving this end, and this includes Mixed Martial Arts. Unfortunately a whole lot of what is being passed off as combatives and self-defense is also sports based. It has lost those elements that make it capable of ending a physical conflict in under five seconds.

In this manner you create a very specific set of circumstances. That being: It’s never his turn. Not even where he attacks you, that too is a trap. Once he comes into your airspace it’s going to start going wrong for him.

**This is how you run the table in a physical conflict;**

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Effectiveness and the Will To Fight

If you decided to attack someone and found yourself effortlessly picked up, whirled around, slammed into the ground, then told, in no uncertain terms, if you do that again, it will really hurt, how likely are you to try to do that again? Around that time it begins to seep into your stunned mind that the speaker has you in a position that he can start hurting you long before you could even get into position to start hurting him. Knowing that the only thing between you and great pain is the self-control of the person who just whirled you around like a pizza dough, most people decide that maybe now isn’t the time to resist. I start this section by examining a person’s will to fight when he lacks the ability to hurt you.

Effective vs. Lethal

When people hear ‘over in three,’ they tend to assume that after three bone crushing moves the opponent will be laying at their feet dying. Not to ruin anybody’s Anime/Manga fantasies, but effective offense doesn't necessarily mean lethal. In fact, you don’t even have to break anything. Most violence, although very scary, isn’t lethal or damaging. The simple fact is, Drunken Uncle Albert, a quarrelsome drunk friend, an out of control teenager or a tantrum throwing idiot make up the bulk of violence you’ll face in your life. Still, the same principles that will keep you alive in a deadly force encounter, can be applied to ending a non-lethal scuffle with minimum damage to everyone involved.

Understanding Effective Movement (Strategy)

Before you can begin to tactically apply this kind of movement, you need to understand the theory of effective movement. It isn’t just punching someone over and over until they fall down. It’s a continuous flow of ever changing offense ... and just when he thinks he’s got one figured out (and maybe what to do with it) another one pounces on him. He never gets the chance to catch up, much less counter.

The Application of Effective Movement

What I’ll do here is to give you examples of how to become more effective in your tactics so you can begin to apply the concepts to what you already know.

1) Although this is often attributed to Bruce Lee, he got it from Sifu Ark Wong Yuey. Who he studied under for a short time in Los Angeles before leaving Ark’s school, or being asked to leave (the story varies according to who is telling it). Marc’s Sifu, Alex Holub ‘beat’ into his head the idea “a fight should be over in three moves, otherwise get back and see what you are doing wrong.” Alex stated that is what Ark Wong had taught him. When Marc asked Sifu about this philosophy, the old man confirmed it

2) For the record, when I say the ‘fight’ is over in three, that doesn’t mean you aren’t going to have to ‘sit on him’ until he calms down or your co-workers arrive with restraints or handcuffs. When I say he can’t fight you anymore, I’m talking that he’s down on the deck and you’ve got him wrapped up. Unfortunately, restraint and control techniques are designed to not damage the resisting person. And that means you occasionally get to wait out a tantrum on top of someone. What you can do, however, is put him down quickly and easily so you safely and effectively gain control of him in the most effective (and least painful for you) method possible.

Right vs. effective

When you do a technique, you have to understand not just what you are trying to achieve, but what is involved in achieving that goal. Just doing the technique doesn’t mean that you are generating, much less delivering power. A technique is a series of moves. In theory, each move achieves a certain component necessary for the whole process. While they are very much “a step in the process” a better way to understand them is that they are “building blocks” within the technique. You may be thinking a “wall of defense” but if you have bricks missing, you got some serious problems. The entire structure is going to be weakened and vulnerable.
With this in mind, it is easy to see how either a) failing to do a part of the technique or b) if things have been lost from the technique, components just aren’t there, you will fail to generate power.

The b) part of the previous sentence is grammatically funky, but it is exact. And it describes a very big problem. All too often you are doing a move exactly how you were taught to do it, and it still fails. The problem is not with you. Thing is, you did the move “right,” but components have been lost. In these circumstances what you end up with is the shape, but not the function of the technique. The best analogy is imagine a car. It is shiny, polished and beautiful, except for one thing. It’s missing the engine. What you are left with is something that is all form and no function.

The sad thing about this is that in the martial arts wars between schools and splits in styles have developed over who is doing the technique “right.” This is a meaningless concept on so many levels that it’s hard to find a starting point, but we’ll start out with the happy version first. To begin with, even in styles that have retained their effectiveness, there are always several ways to perform a move. Often each of these variations have different, but equally valid, applications. As such, there is no one right way to do a move. Do it this way and you get this result, do it that way and you get that result. Arguing over who does it the right way in their style is like arguing which is the one right tool to have in your tool box. You should have a variety.

Now the not so happy version. The pathetic thing is that often what the two schools are arguing over is who has the “true” car...the one without an engine or the one without the transmission. This is why I advocate you not looking at this problem in terms of “who is right” and “who is wrong.” That approach not only politicizes the subject, but also blinds you to the technical problems you’re trying to fix.

Putting it mildly, I don’t care about who is doing it "right." And I especially don’t care who has the “true” martial art. My concern is very simple, does it work as advertised?

If not, odds are components have been lost.

So here you have two potential problems that supersede any argument over which school is doing “it” right. First is what they are teaching effective? And if it is, then I move onto the second potential problem, namely: Is the student performing ALL the component parts?

The sad truth is that most techniques fall down long before you ever get to the second problem. If the student is not doing it “right,” it only compounds an already existing BIG problem. Yes, the student doing it wrong does give the technique a flat tire. Well, if it weren’t for the missing engine and transmission, that flat tire would be a serious problem.

Unfortunately for law enforcement/correctional officer, mental health orderlies and security personnel the problem is a little more immediate. That’s because “departmentally approved techniques” are often intentionally gutted to make them less effective. That’s right. Because someone upstairs is concerned that you’ll hurt someone while trying to subdue them, an overwhelming majority of the techniques you have been trained in have been watered down to protect the institution. The components that would make them effective have been intentionally removed. This makes fixing the problems even more important because, unlike martial artists, techniques failing to perform will cost you pain, blood and injury when trying to subdue someone on the fight.

**Diagnostics**

So how do you run a diagnostic on a technique? First, take a look at the Use of the Power Triangle in Basic Techniques.

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**Footnote:**

Second ask yourself does every move in the technique meet the criteria of running the table? These are the elements that must also be present in every move.

Third. Don’t just pay close attention, pay microscopic attention to body movement and the physics.

Poorly done body movement tends to manifest in one of two ways. The first way is that it just isn’t there at all. All too often people take a stance and then proceed to just wave their arms around.

Let us state right here and now that this is a ‘tournament hyung competition’ approach. It will win you all kinds of trophies. But it will not generate power. In forms competition, body movement is routinely sacrificed. This is to say that a person takes a stance and then proceeds to do incredibly fast hand and arm movement. He can do so because he is operating from a stationary and stable base. From this base, his hands can move with blinding speed. The problem is, without his body mass behind the moves, there is no power.

Power comes from accelerating mass, not speed alone. But, this incredibly fast (and precise) hand and arm movement looks REALLY good and wins competitions. Which is why it has become so popular.

The second way poorly done body movement manifests is it takes a "crash course."

By this I don’t mean a short and intense study program, I mean it takes a head on collision. Effective body movement has all kinds of small tweaks, wiggles, shifts and twists. The easiest way to understand why this is so is to realize that it is not only designed to get you out of the way of an attack, but to move you around obstacles (like your opponent’s leg). For example, instead of crashing head-long into his planted and weight bearing leg by stepping forward, a circular step moves you around his leg so when you shift your weight onto it, you hit his knee from the inside, thereby disrupting his structure. By cutting his legs out from underneath him, you meet the criteria of running the table. If you’re bigger than your opponent this strategy might work. But by crashing head-long into him, more commonly all you do is momentarily destroy both of your abilities to effectively attack. That’s because, with an opponent of equal size you’re both going to be effected negatively. As such, you’re both going to be spending the next second trying to regain your structure instead of attacking effectively. If your opponent is bigger than you or has better structure your going to bounce off. That leaves you unable to attack and him still able, not a good thing.

The fourth element of diagnostics is: Is it demonstrable?

By this I mean that you can stop an effective technique anywhere in the process and identify what is making it effective at that exact moment. Gravity doesn’t suddenly cease just because you are transitioning from one pose to another. An attack doesn’t magically stall in mid flight while you move to block. An opponent’s leg doesn’t flicker out of existence for a moment so you can move through it. An opponent’s structure and balance doesn’t suddenly fall apart just because you’ve moved over there.

You should be able to stop a technique at any point and identify what is happening and why it is working. This is how and why I use the idea of running the table. When you break a technique down into moves, you will see where a flawed technique is missing key components, without these components, you will not be meeting the standards of running the table. If you don’t not only will he be able to resist, but he will be able to counter attack. Effective techniques should not fail because they keep you safe, keep him on the defensive and allow you to continue the offense. Whereas flawed techniques fail all the time because they don’t meet these standards.

When trying to fix techniques that are not working one must look at the entire process, and not just at the end pose. Usually it is during the process that you will find where things have gone missing from how the technique is taught. For example, in a defensive move, ask yourself "where in the process are you vulnerable to being hit?"
Take away their posture

Because all human beings possess basically the same musculature, skeletal structure, and nervous systems, and because we are all subject to the same unalterable laws of physics, there can only be one most efficient way of performing a reverse punch or any other technique. So, if you want to maximize the strength and efficiency of any given type of physical movement, it behooves us to examine how to best utilize the strength and structure of your body and the principles that can make significant differences in the efficiency of the techniques.  

The Ultimate goal is to control the opponents center of gravity, which according to Musachi in his Book of Five Rings, can be applied to both one-on-one situations and mass military encounter.

Take away their stance

There is a place in the center of every stance where you can take away the balance of your opponent. This place is described in some styles as the “Third Foot” This place is actually an extension of the opponent’s center of gravity. (See picture on the right) If you step on this spot, your partner will feel slightly unbalanced. If you completely cross it, your partner will be totally off balance and unable to remain standing. Placing your foot on this spot from the front or the back causes a slight disruption in both the physical and mental balance of the opponent. This may seem insignificant, but it will give you a slight edge in your Ho Sin Sool techniques that could be the difference between a good and a bad demonstration.


40 Starr, Phillip, Martial Mechanics, Berkley: Blue Snake, 2008, 149 Print
Third Foot moves with the change in your stance, so knowledge of this spot is very important. (Study the images below.)

Because the majority of your weight is placed on the front foot when you are in a front stance, it is more difficult to displaced the opponent in this stance. If you just try to attack them form the front, the power of your technique is easily transmitted to their back foot and they can remain quite stable.

Because this stance also has width, it also has some stability from side to side. This can make finding the “Third Leg” difficult at times.

Another way to find a weak spot in the opponents stance is Bisect the Stance. If you draw a line between the balls of the feet in any stance, you then can attack the stance from a line perpendicular to that one. (See picture on the left) The closer you are to perpendicular, the more you will disrupt the stance. Try this with someone in practice and see for yourself.

The same theory applies to any stance whether the opponent has their shoulder facing you, or at a right angle to you.

Once you have succeeded in destabilizing the stance, the opponent will be much easier to control.

Zone Theories

“There are a number of ZONE THEORIES that have been created and developed by Martial Artists to enhance student awareness during combat. While the approach to learning these ZONE THEORIES vary, they nevertheless produce comparable results.

The ZONE THEORY is a three dimensional study of an opponent’s anatomy and the space surrounding him. This DIMENSIONAL ZONE THEORY was created to teach students of American Kenpo how to use their imagination to visually divide their opponent’s body into vertical and horizontal zones (sections) as viewed from the front, side, or back. A student who is knowledgeable about its use can: (1) learn the ease by which he can penetrate an opponent’s defense; (2) aid him in preventing an opponent from penetrating his defense; (3) how checking and/or placing controls on his opponent's body can thwart his opponent’s retaliatory efforts (while simultaneously counterattacking his opponent); and (4) how a student’s actions can be activated without his opponent ever realizing it. The theory is unquestionably an excellent educational tool that gives a student a thorough understanding of the countless opportunities that exist in defending or attacking and how to take advantage of them.

1. Height Zones encompass protection or attack on three levels. These levels are viewed horizontally -- from the

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41 Starr, Phillip, Martial Mechanics, Berkely: Blue Snake, 2008, 150 Print

42 Starr, Phillip, Martial Mechanics, Berkely: Blue Snake, 2008, 152 Print
head to the solar plexus, the solar plexus to the groin, and the
groin to the feet.

2. Width Zones encompass four vertical segments that can be
protected or attacked; the left outside shoulder to the middle of
the left side of the chest, the middle of the left side of the chest
to the sternum, the sternum to the middle of the right side of
the chest, the middle of the right side of the chest to the
outside of the right shoulder.

3. Depth Zones entail the penetration and protection of seven
depth zones. These seven zones are also vertical segments with
one exception. They are viewed vertically from the profile. They
start from lead hand to lead knee, lead knee to lead elbow (also
rear hand as in the case of the following illustration), lead elbow
to lead shoulder, lead shoulder to head, head to rear shoulder,
rear shoulder to rear knee and rear knee to rear foot. These
zones may vary in length depending upon the extension of the
arm, body angle, and stance depth. This, nevertheless, does
not alter the points of the zones--only the distance that may
exist between them. See the following illustration. Accordingly,
when directly facing an opponent, depth zones automatically
refer to the varying distances that exist between your natural
weapons and the targets located on your opponent. Surveying
these distances will help to determine the reach and the
choices of natural weapons necessary to make an effective
strike. If the closest target is not the most beneficial, perhaps a
minor strike can set you up for one of major significance.”

To put it in simpler terms, think of the body as being on a three
dimensional axis. If you can control any two of the planes on
the axis, then you can control the balance of your opponent.
Comparing the three dimensions to the Zones Theory, you can
see that as you approach the center of your opponent, they are
more stable. If you want to control them easily, then utilize the
zones away from the center to start your control.

If you have a chance to grab the extremities, control can most
easily be obtained starting from the joints farthest away from
the center (the wrist or ankle) and working towards the center
of the body (the shoulder and the hip).

Conversely, the closer you keep your extremities to your
center, the more power you will have. Keep this concept in
mind as I discuss the joints.

Joints and Power Positions

In Aikido, one studies the movement, the balance, and the
joints of the body. How they move, the symmetry of motion,
and where the power for an attack or defense comes from.
Using concepts taken from Aikido, we can take all that I have discussed so far and start to pull it all together. There will be a few more theories and concepts, but we are getting close to the end.

“In any attack, there will be two stages; first, the dynamic stage of generic motion toward you, around you, etc.; second, the technical stage, which consists of the particular form the attack will assume. The dynamic stage involves what we call a motion of convergence, i.e. the attacker must close the distance between himself and his intended target, you, and the particular part of your body he intends to push, hit, or kick. Even if he is comparatively close to you, he still must take a step or lean forward, twist or turn, in order to be in position to attack.

A defensive aikido strategy begins the moment a would-be attacker takes a step toward you or turns aggressively in your direction. His initial motion in itself contains the factors you will use to neutralize the action of attack which will spring with explosive force from that motion of convergence. The most important dynamic factor to be reckoned with in developing your defense will be the dynamic momentum generated by your attacker’s initial motion, its speed and direction.

The dynamic momentum of convergence is represented by the amount of force generated by the motion of convergence. The human body in motion tends to become extremely easy to maneuver and its vertical stability greatly reduced by any dynamic inertia. If you push a man standing still, bracing himself, you will meet a definite resistance. The same push, however or even a lesser one (in approximately the same direction) if that man is in motion, can send him flying.

This dynamic momentum is closely related to the speed of the initial motion of convergence.” 44 In other words, the faster a man moves, the less control he has over his movements and the easier it will be to unbalance him. Conversely, the more slowly he moves, the more control he has and the harder it will be to unbalance him.

“The factor of direction must be added to the dynamic momentum and to the speed of the aggressive motion of convergence, because it is of the utmost importance that you never meet that dynamic momentum head on, never clash with or oppose it directly and frontally. You might enlarge upon that dynamic momentum frontally with a maneuver which would extend your opponent’s attack beyond the point where he can maintain his balance, but usually you will guide his motion of convergence from the side, curving it slightly and adding a certain amount of your own force (dynamic force) to his already exaggerated movement, thus depriving him of control over his motion and bringing him into a condition of unbalance and decentralized, dispersed power.

There are two main types of convergence an attacker may employ: straight (frontal and direct); and circular (spiral closing upon you). Both can actually be used in your own strategy of defense, in fact will become its foundation; i.e., his motion will provide you with those factors you need to gain control over your attacker’s movements through their “amplification” and then lead him into one of the Aikido Circuits of Neutralization.” 45

Butting all of these factors just discussed we can express them in a single concept; the “Unified Power of Attack”

**Take the joint**

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45 Westbrook, Adele, and Oscar Ratti. "Chapter 4 - The Practice of Aikido." Aikido and the Dynamic Sphere; an Illustrated Introduction,. Rutland, VT: C. E. Tuttle, 1970. 54. Print
So far in this paper I have discussed a lot of physical means of controlling or manipulating an attacker. But what I have not brought to discussion is joint locking. There are several different martial art styles that specialize in this topic and there is too much material for this paper alone.

What I will bring up are the two major styles and how we can apply them to our Ho Sin Sool techniques. The two major styles are long motion or circle and small motion or circle joint locks. They both have advantages and disadvantages. That is why a study of both of them is essential to be a complete martial artist.

“The advantage of big circle motions is that you don’t need to be as precise. But the big motions can also be used to throw the opponent off balance. They can also be used to keep your opponent off balance while leading him into the position you desire. Big circles can also be used to line up the joints and help you to get a sequential joint lock in place.

The disadvantage is that you can be giving your opponent time to react to the situation and counter the movement or lock you are trying to put into place.

With small movement or circle joint locks, you need less movement but a lot more precision to pull off the lock. A smaller, quicker technique can cause more pain earlier and help you to reach your goal more quickly. It also gives your opponent less time to react and counter your technique.

The biggest disadvantage is that small motions are easier to resist and if the opponent tenses up, you could have a hard time effecting the technique.”

The basic premise of a joint lock is to extend the joint past their normal range of motion causing intense pain. This can be used on most joints from the fingers to the spine. Joints can also be manipulated to take them past the point where the opponent has a strong muscular and bone structure behind them.

Some examples of both of these are: a) hyperextend the elbow joint by having the point of the elbow facing the ground and applying upward pressure on the joint; b) bend the elbow so that the wrist is close to the bicep, point the elbow straight up in the air. The should and elbow are now in a very weak position to resist.

In many situations, a joint lock can result in a cascade of locking joints that can be used to throw the attacker off balance, disrupt their Third Foot, direct their center of balance in the direction you wish them to go.

“The act of off-balancing the attacker serves to effectively neutralize the effective strength of the attacker. It is very important to understand that the human body has a primary directive to maintain dynamic equilibrium (maintaining balance). When a person’s body is off-balance, the body automatically and pre-consciously re-directs all available body resources towards re-establishing dynamic equilibrium.”

Any time you can take the joint and manipulate it in a fashion described above, you can add another dimension to your requirements and actually make them easier to perform.

In the future, I will discuss how to apply these joint locks to our required Il Soo Sik Dae Ryun techniques.


The Principle of Centralization as a Summary

As soon as you reach a certain point in your training in Tang Soo Do, you are encouraged to acquire and develop a feeling of stable centralization of your whole being through your Dan Jun. “This spot, also known as your center of gravity, is the spot where your weight reaches its maximum concentration and balance, achieving equilibrium between the central and upper anatomy above and the supporting architecture of your legs below. This area, with its powerful pelvic structure, represents the balanced center of elevation which allows you to stand erect and maintain an upright posture continually and with comparative ease.

From that center of elevation and support, the sum total of your central and upper weight is channeled downward through your legs to the ground.”

In advanced Tang Soo Do practice, we spend a lot of time in learning how to generate power through our hips. We have training exercises and spend hours performing hyungs to help perfect our technique. By consciously paying attention to our lower abdomen as we do all of this, we can reach a point where we can reach our final goal, Hur Ri Twul Ki, as well as the total coordination and harmony of the mind, body and spirit, with our environment. As demonstrated by Masters Wick and Lindsay at the 2012 Masters clinic, learning how to use the concepts of Um and Yang, give and take, hard and soft, becoming one with the attacker as well as yourself, there is no longer a struggle, but a release in the attack. In summation, a point can be reached where we do not have to think about centralization, but we will be centralized. “This Centre will be used as a unifying device in the difficult process of coordinating the whole range of your powers and possibilities. It will be used in establishing a stable platform of unification and independence from which you may operate in full control, relating to and coping with your reality, combat, or an aggressor. Your training in becoming and ultimately in being centralized will involve your personality totally, both within and without.

This interesting concept of centralization is well known in the Orient and is amazingly comprehensive. Its dimensions range from the cosmic or universal where the Centre is identified with the idea of order, harmony, and total integration in the balance of opposites, to the human and personal, where it is seen as the balance point of your personality, the unified basis of your individuality and particular character.

Both the cosmic and the human dimensions of the concept, however, are closely identified, man being an integral part of creation. The true and all encompassing Centre, according to Eastern philosophy, is the same for both the general and the particular, for the universe and for man. This is underscored in many Japanese tales of the wise man who lives in harmony with himself and with nature. Separation of man from that identity with the universe, alienation of man from man, and finally, a man’s feeling of a split within himself are considered to be the result of paying too much attention to the surface differences, to the details of life. This completely ignores the underlying identity of all life, the basic “oneness” of its essence.

“Centralization is intended to further the unification and coordination of all your powers, mental, physical, and functional, so that yours will become a truly coordinated personality.

The effects of this “inner” centralization, according to the doctrine of Aikido, will be evident. In the mental dimension, all of your powers of perception, of evaluation and decision, and of reaction will be heightened and sharpened as result of this fusion. You will find yourself seeing, understanding, responding with extraordinary clarity and intensity.

Centralization, therefore, means adopting a new point of reference, a new platform from which you can exercise a more objective form of control over events and over yourself.

This inner centralization, when correctly understood and practiced, will produce certain noticeable effects in your body, i.e., the development of balanced stability and relaxed suppleness.

Centralization in the lower abdomen, moreover, represents a sort of, gravitational descent of your body’s weight, draining the upper anatomy of excessive muscular stress and leaving it extremely supple and mobile (especially the muscles of the neck and shoulders which so often display the first signs of paralyzing rigidity).

In Aikido terminology, "relaxation" does not mean a collapsed, weak, or comatose condition, but rather a state of muscular pliability and smooth flexibility which permits an unimpaired reaction in any direction, at the first indication of an aggressive movement.

The authors, therefore, prefer to refer to this condition as one of "relaxed suppleness," with the intention of conveying the idea of softness without rigidity or abnormal muscular tension, while also suggesting resiliency, or a lively smooth readiness to react when and if necessary." 49

In Tang Soo Do we refer to this as Hur Ri Twul Ki, which is the ultimate goal of mastery and movement in the martial arts. The study of movement, both physically as well as mentally and spiritually is a lifetime effort and one that we all should pursue.