

To AJKA-International
AJKA-I of PA
Instructor Trainee's Report #9

Subject: **“Body Shifting Power in Karate”**

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Power is defined as the amount of work done. It is equivalent to an amount of energy consumed per unit of time. You are not able to generate power without first generating force. Force is defined as something that causes a change in the motion of an object. In karate, force governs how much energy is available for you to hit the target. Power is how much energy is transferred to a target. Force and power are directly correlated. One affects the other. All of the force created is turned into power and the greater the force the greater the power. One of the primary methods of generating power in body shifting is the use of reaction force.

To understand reaction force in karate we must first look at its application in physics by reviewing Sir Isaac Newton's Three Laws of Motion:

1. Every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it;
2. The relationship between an object's mass m , its acceleration a , and the applied force F is $F = ma$. Acceleration and force are vectors (as indicated by their symbols being displayed in slant bold font); in this law the direction of the force vector is the same as the direction of the acceleration vector;
3. For every action there is an equal and opposite reaction.

In karate, there are three ways to make power, that is, to transfer force into the target. The creation of power is done by body vibration, body rotation, and body shifting. Of these three power sources body shifting covers the most distance and provides the greatest amount of power. It is much different than simply walking forward because it is the shifting of weight into a target.

There are three types of body shifting: vertical, horizontal and circular. Body shifting is used to change position, direction, avoid initial attack or follow up with a counter- attack. The main purpose of body shifting is for maintaining distance where circular body shifting is used to establish position. What is important in body shifting is that you maintain an effective range with your opponent so that you can counter the attack.

When shifting or stepping in karate, one starts from a position of stable balance, passes through a short period of imbalance, then returns again to a position of stable balance. One's center of gravity moves both laterally and longitudinally. The karateka's center must past the base line; if not you will remain standing still.

Body Shifting is used for longer ranges and distance, when the body center of mass shifts from point A to B we build momentum and energy is transferred to the technique. The Karateka's center must remain center over a constantly changing base of support. Body shifting is done through square stepping, shifting front and rear, decreasing and increasing elevations.

The whole body has to cooperate and integrate to produce maximum force to one direction and in the shortest amount of time. The first and most basic means to produce power are body dynamics, and the bigger the space the more power one can generate. The second means of producing power is internal muscles action, or contraction/expansion power.

Expansion is really relaxation and is the reaction of contraction. Muscles act like springs, contraction is potential energy and when we release this contraction we drive the technique. Relaxation is not simple letting go but must have direction. And then the more relaxed we are during movement the stronger the potential for contraction at impact. At impact contraction itself produces additional power, allows for shocking power by increasing the density and for elastic collision, and is a recharge, potential energy for next action.

In addition, and very crucial, breathing, muscles action, body dynamics, ground reaction energies and technique (closing and opening of the joints), have to match and synchronize in order to be effective. As one becomes more skillful, internal muscle action becomes more important, and the goal is to produce more force in less action space. Body dynamics and muscle action are used together along with breathe to be matching and synchronized.

Body action is initiated from the body center because the biggest, strongest muscles in our body are at this region, such as gluts, abdominals and back muscles. If we look deeper into this than the movement of the body center should be initiated from the smaller muscles attached to the spine, in order to stabilize the spine and provide stable foundation for the bigger, external muscles to move from. The body center is both engine, center of action and crossroad of the body. Energy from the feet to the hands or from hands to feet has to transfer through the body center. We say that technique is initiated from body center using ground reaction force, since no matter how strong the muscles at the center are energy cannot increase without ground reaction.

We can also review the principles of Body Shifting Power in Karate by reviewing an oi-zuki. Proper shifting requires that one begin from a proper stance. By starting from *zenkutsu-dachi*, one's feet would be laterally shoulder-width apart and longitudinally twice shoulder-width apart. The outer edge of the front foot would point forward while the outer edge of the rear foot would point out forty-five degrees. The front leg would be bent, with the knee facing forward over the arch of the front foot. The rear leg would be straight, with the knee facing forward. The front leg would bear about 60% of the body's weight.

To initiate movement, the rear ankle and leg flexes, the rear foot pushing forward. At the same time, the gluteus flex strongly, tucking further under the spine. This tucking of the gluteus results in the rear leg being pulled forward to the intended target; additional force is generated by thrusting the rear leg against the floor creating a reactionary force from the ground.

This leg force is added to the thrust generated by the upper body and hips in the execution of the punch. This leg, having pushed off the ground, now relaxes as completely as possible as it is pulled by the gluteus. The rear foot and knee come alongside support foot and knee until the torso's center of gravity is forward of the supporting foot.

At this point, the supporting ankle and leg flex strongly, propelling the torso's center of gravity forward. The advancing leg snaps out along the floor to find its proper position. The support leg straightens and every muscle locks momentarily. During the same moment the hand on the hip begins its path towards the target the lead hand is withdrawing sharply back to the opposite hip. This particular type of movement is commonly known as "draw hand" or hiki-te. The faster the hand is withdrawn the harder the opposite reaction which is the punch. Moreover, the proper muscles must fire in the proper timing and order to create the strength and speed – this all begins with the will of the karateka.

Proper movement is achieved by c-stepping. A c-step is performed by bringing the knees and feet together monetarily during the course of the step. It's important to note several points. First, the center-of-gravity does not rise or fall. It remains the same distance from the floor during the entire sequence. Second, the gluteus must be tucked under the spine prior to initiating the movement. If they are not, then the upper body doesn't shift along with legs, resulting in corruption of the technique. Lastly, roper shifting requires proper posture. The spine is vertical, the head sits straight upon the shoulders, and the stomach muscles are under slight tension, which tucks the gluteus beneath the spine.

It is important to constantly practice body shifting since with the proper training you can create enormous amount of power can be generated.

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