

# Fundamentals and application of Karate

## Muscle Control

By Ritch Rice 10/25/2019

### Introduction

The origin of Karate has roots in Chinese martial arts (or Kung fu) which can be divided by Northern and Southern regions. The Northern styles focused on fast and powerful kicks, high jumps, and fluid/rapid movements. The Southern styles focus on strong arm and hand techniques, stable stances, and fast foot work. Our style is closest to the Southern region styles.

Another way to divide the styles is internal verses external. External focused on improved muscle and cardio while internal focus is qi (or chi\*) life force manipulation. A common saying concerning basic martial art training is “training must include both internal and external training. External training focus is hands, eyes, body, and stances. Internal training focus is heart, spirit, mind, breath, and strength.

The focus here of my paper is on the internal part of training and presents a study of muscle control in the practice of Shotokan Karate.

In my opinion proper muscle control is a key element to Karate (or any Martial Art) and one that must be mastered. In simple terms muscle control is compression and expansion. Compression implies making the muscle tight and expansion means to relax.

If you look at the kata Sanchin found in several martial art styles (Goju-ryu, Shorin-Ryu, Uechi-ryu...) you will find this to be a fundamental focus. Similar example is found in the beginning of Hangetsu (Shotokan). But the Sanchin kata has exaggerated slow muscle contraction and breathing throughout. This slow exaggerated contraction and breathing allows one to develop muscle control through this slow deep breathing, muscle contraction and expansion.

In my opinion in order to execute a proper Karate technique or movement you must be able to have proper control/command of the body muscles. Without this level of control you will not be able to maximize speed, power, and efficiency of a technique or movement.

Proper muscle control requires the correct mind set, breathing, and synchronization / body connection.

*\*The Chinese define **energy** as **life force**, or **chi**. Prana is physical, mental, and spiritual **energy** in Hinduism. It is believed that prana is the fundamental **energy** and the source of all knowledge. ... **Chi**, in Eastern medicine, is the **vital energy** that flows through each organ and system of the body*

Correct muscle control is a core element in the practice of Karate that touches every aspect of the art from a basic punch or block to proper stance movement. Without it in general bigger is better and will dominate. This muscle control is what gives someone who study's martial arts the ability to defend against someone bigger.

Proper Karate muscle control or lack of is not always directly obvious, but can be seen in the course of training exercises or execution of a KIAI for two examples. (A KIAI from the chest is more like yelling which still can be effective if you are trying to intimidate or drive someone away, but a KIAI from the stomach is a guttural core driven, body connecting animal like action that brings the whole body in to play)

This paper explores the following aspects: Muscle control fundamentals, Kihon, Kata, and Kumite application and some ways to develop this muscle control.

## Muscle Control

### Fundamentals

In the course of Karate movements and execution of techniques we control the voluntary muscles using the brain. There are of course involuntary muscles that control basic breathing and blood pumping but the focus here is on the control of voluntary muscles.

Eventually you want the voluntary muscle control in Karate to be instinct which means for the most part the brain is not involved. You don't think you just do or react based a "programmed or learned" response. Kumite section will talk more about this point.

The key is to contract only muscles required for action at the right time and with correct amount of intensity or volume. The ability to relax quickly (conserve energy) is equally as important as quick contraction. You need to be able to adapt and change direction or technique as needed. Simple example would be in execution of a punch if blocked you need to be able to relax the muscle and move to another target. Be able to flow and adapt as necessary.

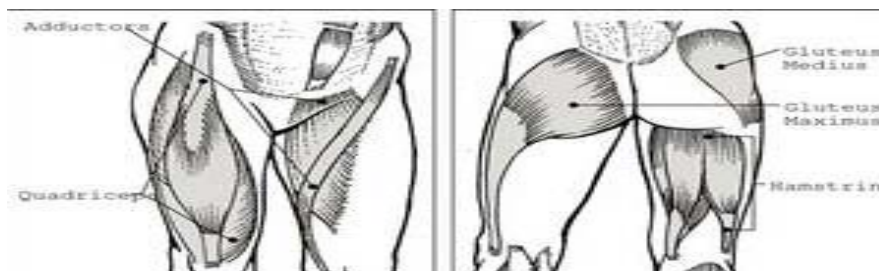


Figure 1. Key lower body muscles: gluts, adductors, quads, and hamstrings

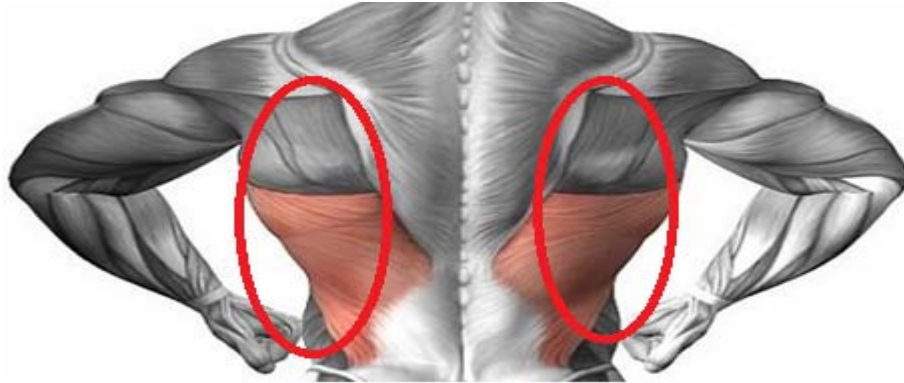


Figure 2: Key upper back muscles

- The punch itself involves contraction of mostly the large upper back muscles with some bicep and forearm. (not shoulders, neck, or face)

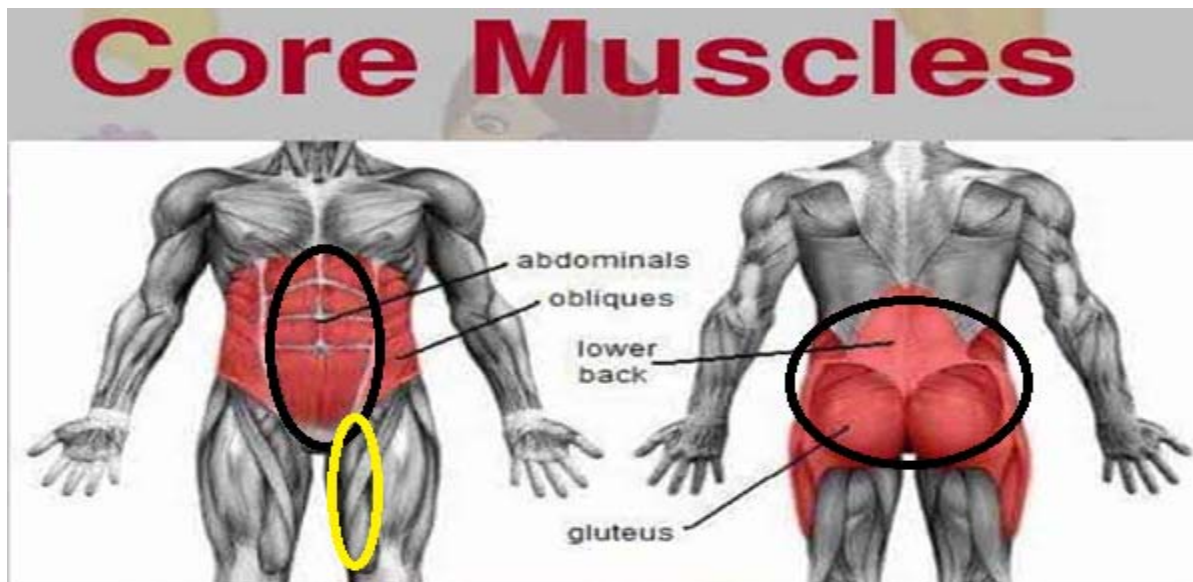


Figure 3: Core Muscles: stomach, gluts, inner thigh, back. These make up what I call the core muscles.

**Quick twitch muscle control:** You can develop a fast reaction by waiting for count while training. Don't anticipate, just be ready internally to react. The learned reaction one has to a groin kick is an example of a quick twitch reaction. This is the type of reaction or movement used in Karate. We want a quick reaction that releases a small amount of energy quickly and then returns to a relaxed state.

	<b>Fast-twitch fibres</b>	<b>Slow-twitch fibres</b>
Type of work performed	Strength	Stamina
Suited activities	Rapid movements (speed)	Endurance
Type of athlete	Sprinters	Marathon runners
Type of respiration	Anaerobic	Aerobic
Blood supply	Fewer blood vessels	Many blood vessels
Energy release	Small amount quickly	Large amount slowly
Number of mitochondria	Less mitochondria	More mitochondria
Amount of myoglobin	Less myoglobin	More myoglobin

Figure 4: Fast-twitch, slow-twitch.

**Stationary core controls, not feet: move from core, feet will follow:** The core drives the foot to move. Hein Yondan has two examples of that demonstrates this well. In movement 9 when you switch from zen-kutsu dachi east to zen-kutsu dachi north and then again in move 23 when you switch from ko-kutsu dachi to zen-kutsu dachi and grab opponents head. (see kata section)

**Sigh of relief, drop air:** A simple sign demonstrates dropping your air / center of gravity and relaxing the muscles to a neutral state. This creates a feeling of heaviness in execution of a technique. (add figure below)

**Breathing:** Your breathing is also a key element and needs to be from your stomach and not your chest. See figure below.

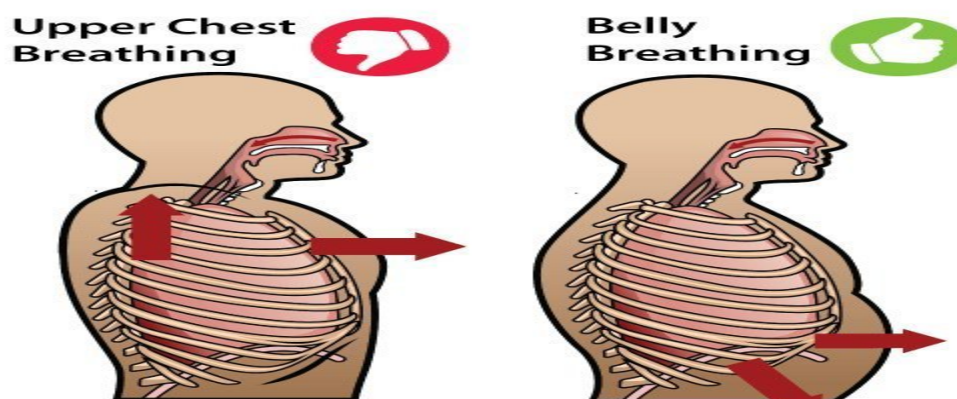


Figure 7: belly (lower abdomen) breathing verses chest breathing.

When you exhale, the diaphragm muscles relax and move upwards, which drives air out of the lungs through your breath.

**Hara breathing:** Karate breathing is from the lower abdomen or what is called Hara (general area from sternum to pubic or “Tanden which is specific area at navel”).

In general all Karate techniques are initiated primarily by the Hara (lower abdomen) and guttural region.

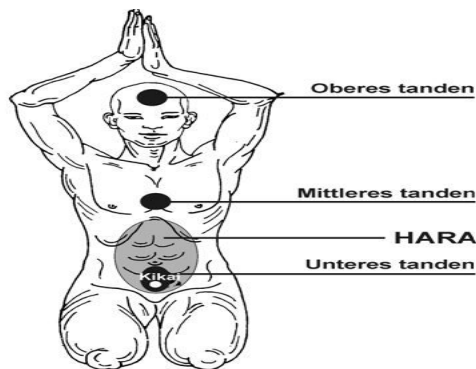


Figure 8: Hara and Tanden

A simple exercise example is shown below. Lie on your back and drive lower back into floor (no gap) by exhaling through mouth from Hara and contracting the glutes.

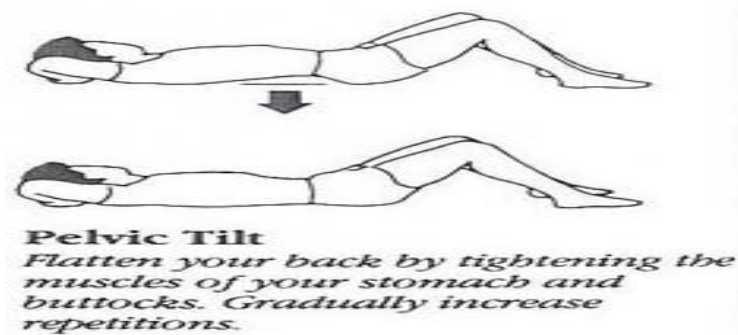


Figure 9: Pelvic Tilt

In the martial arts, the Hara is sometimes considered as equivalent to, the lower of the three dantian (tanden in Japanese). Dantain is defined as the energy center. In Martial arts, this is described as being just below or directly behind the umbilicus (navel).

Teachers often instruct their students to center the mind in the navel or lower dantian. This is believed to aid control of thoughts and emotions. Acting from the dantian is considered to be related to higher states of awareness.



The term dantian used by itself usually refers to the lower dantian, which is considered to be the foundation of rooted standing, breathing, and body awareness in [gigong](#) (Chinese system of physical exercises and breathing control related to tai chi.), [Chinese martial arts](#), and other martial arts.<sup>[9]</sup> The lower dantian has been described to be "like the root of the tree of life."<sup>[2]</sup>



Figure 10: Dantain

There are 2 phases to breathing in any technique. Phase 1 is compression and phase 2 is expansion. Phase 1 compression has 2 pieces. The exhalation from the floor thru the Tanden in the direction of the technique followed by what we call reverse exhalation (note 1) which is from technique back through the Tanden to the floor. Could be compared to an electrical circuit which needs a complete loop.

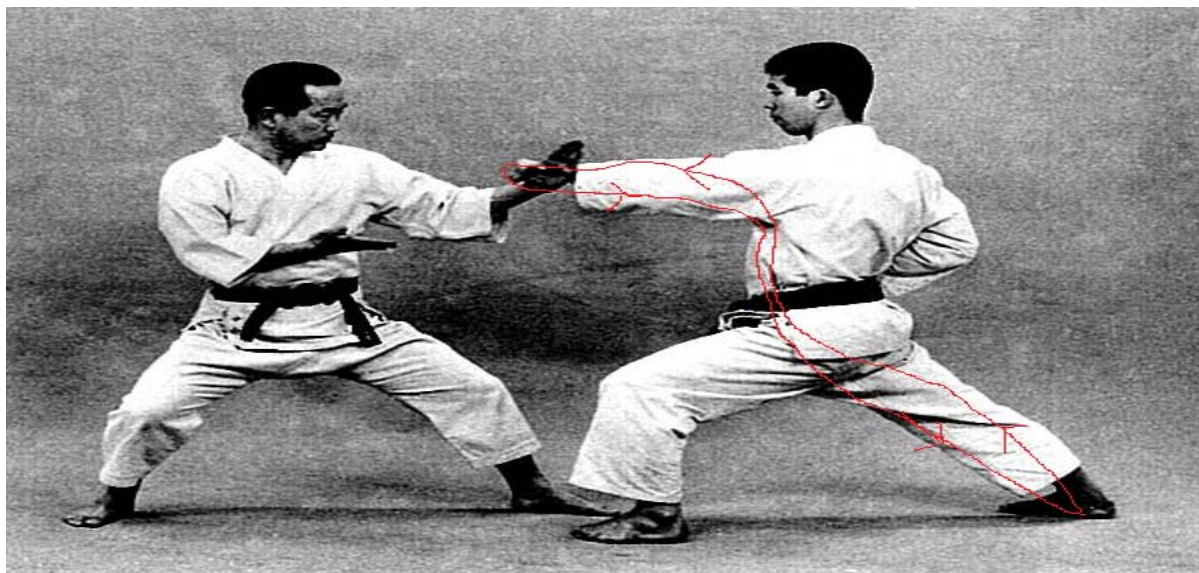


Figure 11: This shows drive path and direction of exhalation (forward) and exhalation (reverse).

Phase 2 of breathing is the expansion which is the natural (or passive) return of air to the lungs.

## Kihon Applications

Zenkutsu dachi: Step in zenkutsu dachi (front stance) to execute a simple Oizuki (punch).

- Stationary zenkutsu dachi :
- Lower body: minimal contraction of inner thigh (adductors), gluts, and core to maintain a stationary position.
- Upper body: Shoulders, arms, face, neck, etc.. is in a relax state.



Figure 12. Lower body muscle forces

In order to step, initiate movement via core muscle contraction (strong muscle inner thigh, glut, core, squeeze/contraction which drives a sharp exhalation), pull with front toes, and drive from back foot to move sharply.



Figure 13. Mid way point transition

At the mid way point it is this momentum and then a sharp rotation of fist and contraction at the end of step/delivery of punch.

- And as soon as the punch is delivered the back and arm muscles relax to the neutral state.
- Similar action/forces stepping in kokutsu dachi or kiba dachi

Kokutsu dachi, shutouke -----> Zenkutsu dachi, nukite: Step back in kokutsu dachi, execute shutouke and then switch to Zenkutsu dachi, execute nukite.

Initiate sharp movement (contract inner thigh, rotate hip) from core (using back leg side) and drive hard and sharp rotation of back foot. Front foot will move (right in this case) due to this action.

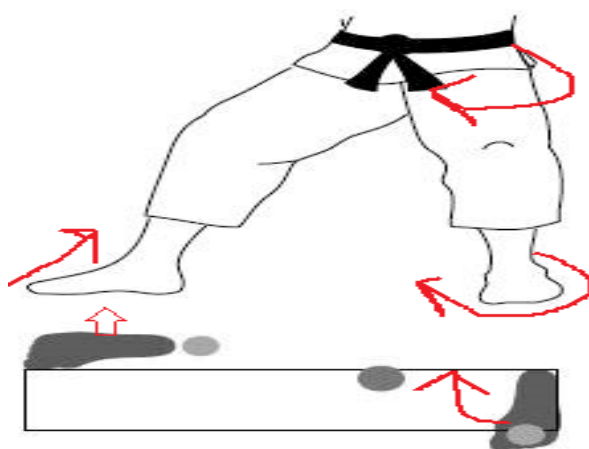


Figure 14. Kokutsu to Zenkutsu dachi transition



Zenkutsu dachi, soto Udeuke -----> Kiba dachi, yoko enpiuchi, tate urakenuchi -> Zenkutsu dachi, gyakuzuki: Step forward Zenkutsu dachi, execute soto udeuke and then switch to Kiba dachi, execute yoko enpiuchi and then switch back to Zenkutsu dachi, execute gyakuzuki.

Initiate sharp movement (contract inner thigh, rotate hip) from core (using back leg side) and drive hard and sharp rotation of back foot and pull front foot for mid way (to avoid sweep) and then drive forward to full kiba dachi and execute yoko enpiuchi, tate urakenuchi (using core vibration). Figure 15a.

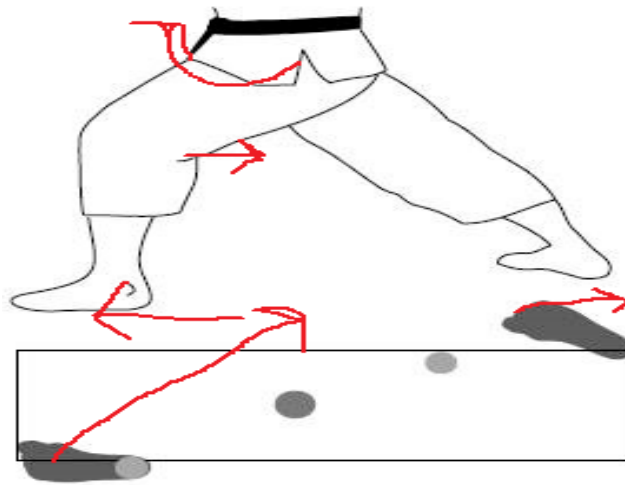


Figure 15a. Zenkutsu dachi to kiba dachi transition

Then finish with sharp movement (contract inner thigh, rotate hip) from core (using back leg side) and drive hard and sharp rotation of back foot and front foot will move as you transition back to Zenkutsu dachi and execute gyakuzuki with hip rotation. Figure 15b.

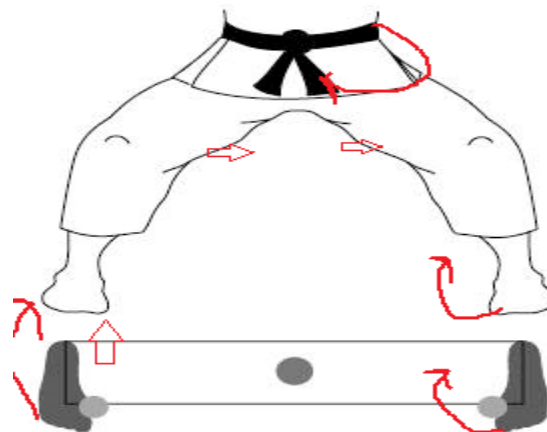


Figure 15b. Kiba dachi to Zenkutsu dachi transition

# Kata applications

Fundamental Kata: Sanchin, movements and significance.

The very basic kata in Okinawa-style karate is Sanchin, and it has been understood historically that you master karate only if you master this kata. One common quote on the Uechi-Ryu, Goju-ryu, .. etc. Kata Sanchin is “A practitioner who doesn’t know Sanchin, doesn’t know Karate”. I agree with this in terms of knowing the primary muscle control in this kata is fundamental to Karate.

Sanchin is the basic kata used to build karate strength (kanren kata), which is the foundation for all other Goju-ryu kata



Figure 16. Goju-Ryu sanchin kata primary sequence

- 1) Starting from Masuba dachi we lower the body slightly (lower center of gravity and root to the ground), inhale strong, rotate toes out and then heels into Shizen tai (natural stance).
- 2) Step forward in into sanchin dachi and strongly exhale slowly while contracting gluts, inner thigh, stomach, back, with feet gripping floor and execute double inside block.
- 3) Inhale strong and slow while pulling back arm to the hip, then exhale strong and slow as you execute gyaku zuki with full contraction followed by relaxation and then full contraction as you execute inside block.
- 4) step forward in sanchin dachi and repeat on other side.



Figure 17. Sanchin dachi

Kata: Hangetsu: Opening movement and significance.

Hangetsu is a shotokan advanced kata. The first few sequences in the kata are executed slowly with strong slow breathing which stresses the development of the hara or chi internal energy. This sequence shares a strong resemblance to Seisan and Sanchin kata's. Due to shared fundamentals of expansion and contraction, Gichin Funakoshi substituted Hangetsu for Sanchin in the Shotokan program. Hangetsu-dachi is the primary stance in this kata. A older Okinawan version is known as Seisan.



Figure 18. Hangetsu-dachi



1) Starting from Masuba dachi we lower the body slightly (lower center of gravity and root to the ground), and step into hangetsu dachi while exhaling strongly and executing inside block followed by gyaku zuki with strong exhale.

2) Then step forward in hangetsu dachi and repeat on other side.

Kata: Gojushiho sho: Several movements and significance.

Opening move of Gojushiho sho: while moving into zen-kutsu dachi block and then execute ura-ken-uchi. Initiate sharp movement by contracting core, stepping into Zenkutsu dachi while pulling with left block/grab and execute ura-ken-uchi with full body contraction.



Kata Application opening move demo:





Movement 36 of Gojushiho-sho kata: turn and execute jo-dan hira shu-to in zen-kutsu dachi.

Initiate sharp movement rotation and contraction of the core, cover/block/catch turn into Zensukusu dachi while pulling with left block/grab and execute jo-dan hira shu-to with full body contraction, hips square.





## Kata application demo 36





Movement 16, 32 of Gojushiho-sho kata: execute sho-to ge-dan-barai and hira kae-te in ko-kutsu dachi. Sharp contraction to drive from core.

Stationary block, sharp turn (move from center/core and strike), and in place block (hook)/strike from Kokutsu dachi open hand

Initiate sharp movement with internal contraction of the core, hook block, strike in place with full body contraction. This is difficult move to generate power/movement since mostly internal action (core muscle squeeze/contraction) with static outside movement.





Kata Hein shodan: block, step punch, zenkusu dachi. Opening movements.

Initiate sharp movement with internal contraction of the core, hard sharp right foot/hip rotation, cover in transition with upper body squeeze, execute low block/strike.



Kata Hein Yodan (steps 9,10): from zen-kutsu dachi (facing east), drop left hand ge-dan-barai to north with right hand in open yoko-gamae to east and then switch to zen-kutsu dachi facing north and execute open hand jo-dan block and strike to neck/head level with right shu-to-uchi.

1) Initiate sharp core vibration to execute first movement. (9)

2) Initiate sharp inner thigh and core contraction to drive second movement.(10)

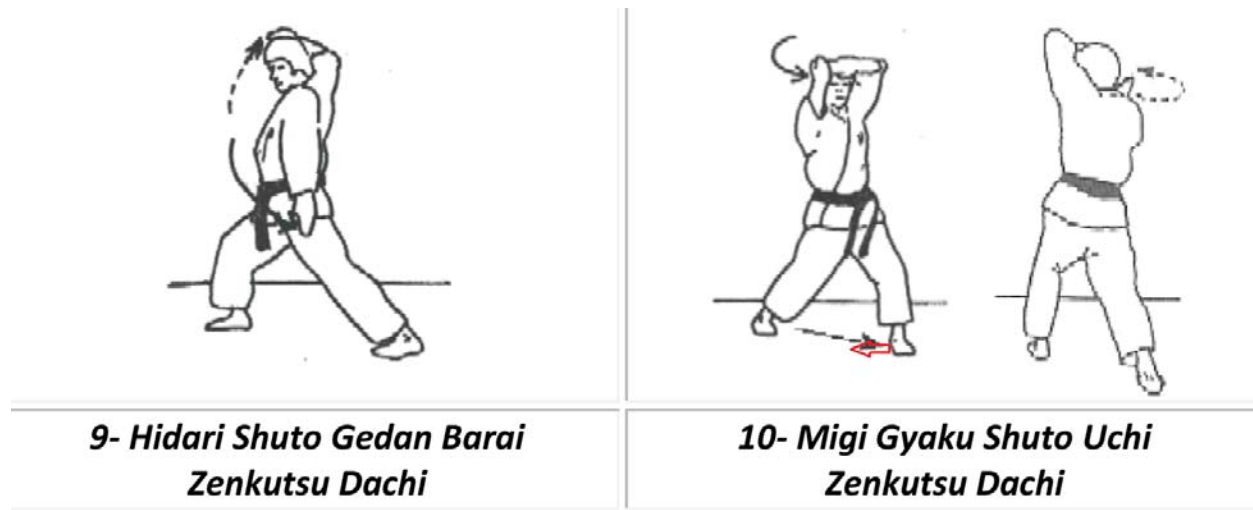


Figure 19: Hien yodan step 9-10

Kata Hein Yodan (steps 22, 23 or 23, 24): from ko-kutsu dachi/moro-te-uke switch to zen-kutsu dachi and grab the head with open hands.

Initiate sharp movement (contract inner thigh, rotate hip) from core (using back leg side) and drive hard and sharp rotation of back foot. Front foot will move (right in this case) due to this action. Lower body core drives upper body grab.

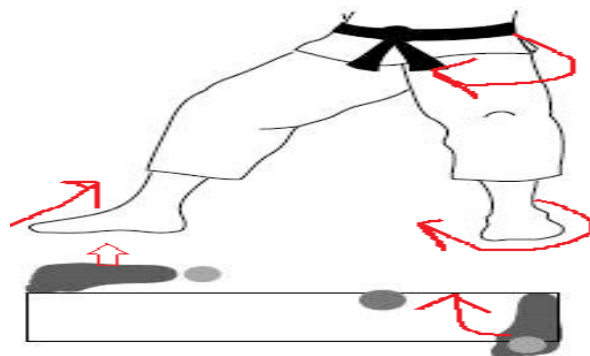


Figure 20. Kokutsu to Zenkutsu dachi transition

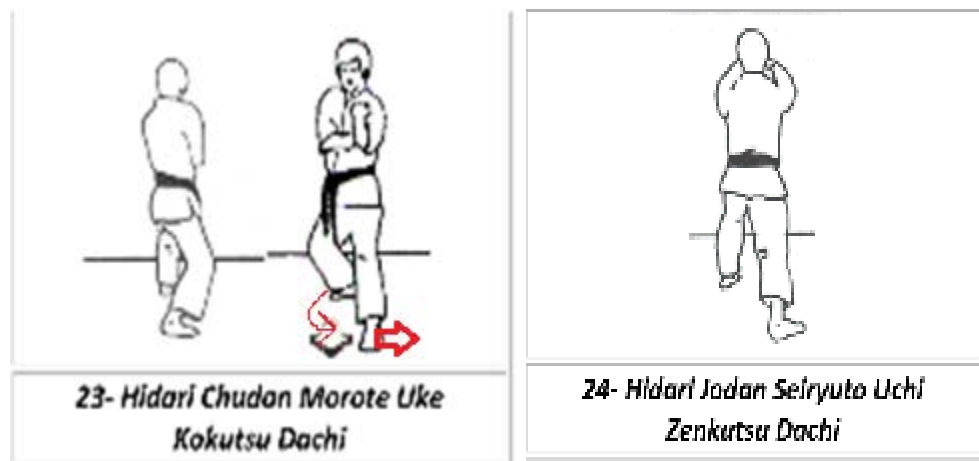


Figure 21: Hei yondan Kata steps 23-24.



## Kumite application

Kumite should be done with a relaxed but ready state of mind. To quickly move and respond you must be light on your feet with a dance like flow and be able to go from 0% (no or very little tension/contraction) to 100% (full body contraction) and back to 0% (relaxed).

If the mind is tense the body (ie muscles) will be tense. If the muscles are tense in between execution of techniques, the movement will be slow, inefficient and predictable.

1) no, face, upper body tension

2) no, indication of action

3) Yes, focused, but no tension, poker



### Relax, clam mind:

“Empty mind” or Japanese term mushin meaning no mind. To move and execute instinctively. In other words we want to avoid thinking with the brain and execute based on instinct. This also means maintaining a “poker face”. Don’t bring your action into your face. The face muscles do not contribute anything but give away your intent and waste energy. Calm mind means relaxed, quick movements. Initially we train different combinations to practice to see what works and what doesn’t so thinking is involved, but our goal is instinctive movement.

### Seisan meditation:

The idea of mediation is to be able to clear our mind with outside distractions to allow you to be in the present rather than past or future. We practice this in a limited way before and after class to try and bring the mind to a state ready to train and focus on Karate.

Kumite: punch, deliver, adapt as needed, don't force action, flow with movement. Drive zuki punch with right side from 0 to 100% contraction and then relax back to 0% and then contract to block attack from right side.



## Control drills and exercises to develop muscle control

Below are a series of drills and exercises to help develop muscle control for Karate.

- 1) Exercise: Body unity: push up, hands or fist, elbows close to the body, contract lower back, stomach, gluts and exhale while driving fist or hands into the floor. Body moves as one piece all connected. Like punching the floor.



- 2) Exercise: crunch, sitting, palms out, rotate fist in and contract stomach, gluts, back, inner thigh, exhale, body just off the floor, hold 1 sec, then down.

- 3) Exercise: crunch, standing, palms out, rotate fist in and contract stomach, gluts, back, inner thigh, exhale, back straight, don't round shoulders, hold 1 sec, then release. (slow and quick)



- 4) Drill: zenkutsu, left leg forward, 45deg, no hands, rotate 90deg using core action (squeeze inner thigh, gluts, stomach) with a quick, sharp action. Core will drive the feet.
- 5) Drill: zenkutsu, left leg forward, 45deg, with hands, rotate 90deg using core action (squeeze inner thigh, gluts, stomach) with a quick, sharp action and reverse punch (Chudan, Gyaku Zuki). Core will drive the feet.



- 6) Exercise: big ball contraction and expansion, slow, fast, individual, with partner moving like free sparring.



7) Drill: Zenkutsu, hands down, step slow/fast, palm heel strike, drop hands, then with partner 1,2,3. Works on stance movement and quick twitch muscle action. 0% -→ 100%--→ 0%-→100%





- 8) Exercise: Zenkutsu, stationary, punch newspaper. Works on snap at end of punch.
- 9) Exercise: Clap test, Kiba dachi or Zenkutsu dachi, partner, one side punch and other side catch (clap).
- 10) Exercise: Gi punch, Kiba dachi or Zenkutsu dachi, partner, one side punch and other side loose Gi.
- 11) Drill: foot work, Zenkutsu dachi, with and without partner. Left, right, forward, and backwards.
- 12) Drill: foot work, Kiba dachi, without partner. Left, right.
- 13) Exercise: Sigh of relief, drop air hit pad.
- 14) Exercise: sigh of relief, kiba Dchi, and execute sharp punch to pad (1,2,3). Helps with relaxation and sharp contraction.

## Summary of paper concepts

**Quick twitch muscle action:** The key to quick, sharp movements and has same feel as the instinctive response a male has to a groin kick. This a sharp, quick instinctive physical response and the same for every male person. This is important for both effective offense (counter attack) and defense (react to attack).

**Compression/expansion:** This is key creating and delivering energy. The compression phase creates potential energy like winding up a rubber band. The expansion phase is the release of that energy like unwinding of a rubber band. Example is a simple wind up car or plane as below. Wind up propeller to create and release to deliver. Karate example a simple maegeri where is bring the knee up as you compress and then release to delivery energy/attack.



**Kumite/Yoi:** The feeling you want to have in kumite is very similar what you see as a big cat prepares to attack or takes a defensive position against a perceived threat. They typically drop their center and compress into a ready position ready to spring or pounce on their prey. Yoi or ready position should have similar feeling. The engine is on and idle and ready to go.



**Punch and Core action:** Think of the core (Hara) like handle of a whip and the body of the whip is from the core up through the back and through the arm to the end of the whip at the finger tips. You drive the core with a hard quick muscle twitch which generates a ripple wave all the way through to the hand as you snap (sharp rotation with every technique: punch or block).



Another way to think about it is like “punching with your legs”. The lower body throws/ hurtles the extremity (arm) as you drive the foot into the floor. (floor connection). Here you can see energy inwards towards the core so I have rock solid balance and much more punching power. My arm is being released outwards but the rest of my body is whipping that arm out powerfully by projecting inwards. <https://www.expertboxing.com/power-punching-secrets-part-2-implosive-punching>.



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### **Sanchin Kata, the Three Battles Sequence**

*by Kris Wilder*

*February 15, 2010*

<https://ymaa.com/articles/sanchin-kata-the-three-battles-sequence>