## JUDO-RON 52- Kumi Kata in judo

Over the past few months, I particularly observed how easy it was for students to develop bad training habits. I mainly watched how some of the students performed their initial seizure of the judogi while engaged in various Tachi Waza exercises. The various patterns adopted to place the initial grips on the opponent's sleeve, collar or lapel appeared to favor the unnecessary use of strength to keep an arm-length distance and avoid making the best use of their own energy.

I pursued my surveillance during their practices of Uchi Komi (repetitive entries), Nage Komi (preparatory displacements with emphasis on the Kake), in Yakusoku Geiko (free technique without opposition), in Kakari Geiko (roles playing in offense and defense) and mostly when engaged in Randori (free exposure to the adversary's opposition). I was able to confirm that:

1. They avoided positioning themselves to make better use the right or left approaches.
2. They maintained a weak distribution of their weight when in a natural standing posture.
3. They were somewhat confused as to how to maximize the elements of discovery associated with a defensive stand.
4. They lack the understanding of how to make proper use of the hands as sensors-receptors of the opponent's signals, as medium to transfer their own energy and as effective tools to grasping and hold the judogi to maximize surprise and dexterity in the application of their techniques.

### Aim

With this small exposé, I wish to review the basic principles associated with the *Kumi Kata*[i] and explain how best to secure and take advantage of a superior grip to make the most of the opportunities as presented both during the attack and the defense phases of Tachi Waza.

### Previous reference

In a previous document entitled "*Yield to Overcome*" [ii] I presented a description of the Kumi Kata as part of a microscopic view of the ten fundamental elements of judo. It was demonstrated that: to be effective, the judoka must be able to act and react fast to whatever is happening between the two opponents. From the start of every contest, the judoka must ensure that both his hands work in unison, complementing each other in their actions. He needs to position himself by securing a preferred grip which will permit the greatest freedom of action. This action is known as Kumite Arasoi, or maneuvering to obtain the preferred position and grip in preparation for executing any given technique.

It was demonstrated that the act of observing the opponent's movements provide the first opportunity for gathering strategic combat intelligence. The second line of assembling tactical information is made in part by the sensory activities of the hands touching the opponent's garment or body.

**Importance of the hands**

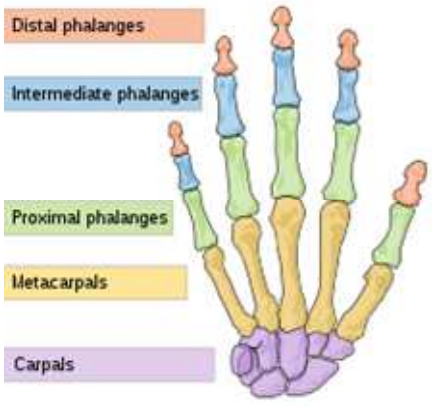
During preparation of a judo session, the hands warm up exercises are frequently overlooked. In general, we pay little attention to include the hands warm up exercises in the routine. Yes, we all understand very well that the generals warm up drills are beneficial to both the cardiovascular and muscular skeletal systems and that a warm muscle is more efficient and less prone to injury. Nevertheless, it seems that we place too much emphasis on the activation of the lower limb joints through short bursts of running, sprinting or jogging to the detriment of the other joints that must receive equal time in the preparation.

A case in mind are the assorted endurance exercises associated with the hand movements and griping functions that need to be performed to permit the various cartilages to thicken and better lubricate, nourish and stabilize key segments working in the hands.

To address this issue, let us quickly review the functions associated with the hands since the latter have a complex, intricate, and fascinating anatomy. Their integrity is absolutely essential for our everyday activities. In my mind, every judoka needs to better understand their compositions and functions in order to make greater and more intelligent use of them.

The hands are our main structures for physically manipulating our environment. They have hundreds of useful functions: to push, to pull, to feel, to point, to hold, to grasp small and large objects and they can be used for multiple and delicate tasks as well as perform labor intensive activities.

The fingertips contain some of the densest areas of nerve endings on the body and are the richest source of tactile feedback. They can be activated in tandem as well as operate individually since each hand is dominantly controlled by the opposing brain hemisphere, so that the preferred hand choice for single-handed activities such as grasping, pushing, lifting, pulling pointing or writing with a pen, reflects individual brain functioning.

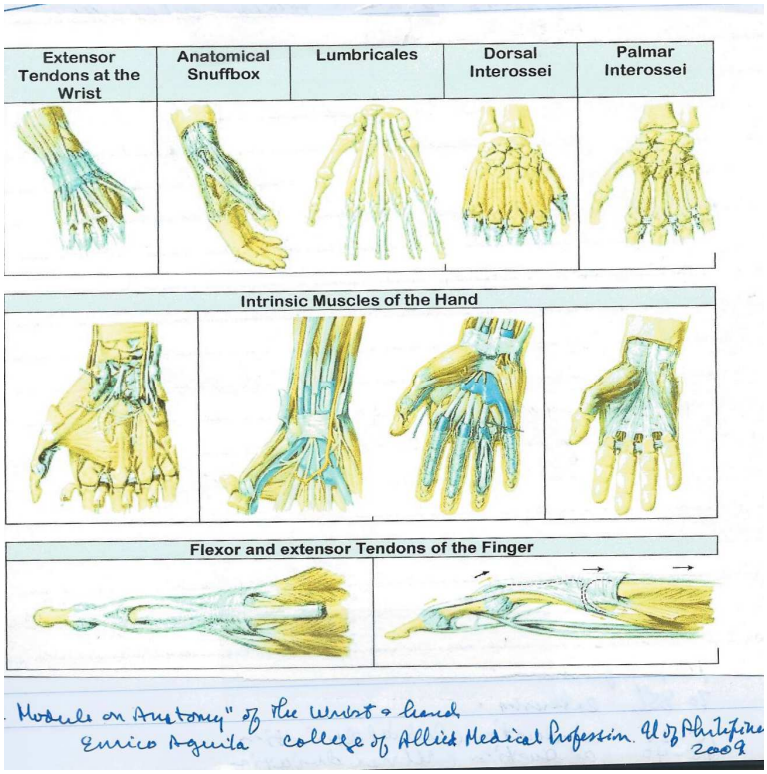




Overview photos from <http://en.wikipedia.org/wiki/Hand>

**Brief composite picture of the hand**

The human hand has 27 bones organized into rows which are articulated with the skeleton of the forearm and with the bases of the metacarpal bones (i.e. the bones of the palm or "hand proper"). Together, they play a major role in supination and pronation (rotation about the axis of the forearm). The hands enclose different muscles which are subdivided into two principal groups: the extrinsic and intrinsic muscle groups.

The extrinsic muscle groups are the long flexors and extensors. They are called extrinsic because the muscle belly is located on the forearm. The intrinsic muscle groups are the thenar (thumb) and hypothenar (little finger) muscles. We can also locate the interossei muscles (four dorsal and three volar).
The fingers have two long flexors, located on their undersides and surrounded by layers of tendons and cartilage around the phalanges. The flexors are the pulley mechanisms which allow for the actual bending of the fingers. The thumb has one long and a short flexor. The thumb also has muscles in the thenar group to better facilitate the grasping motion.
The extensors muscles are located on the back of the forearm and are connected in a complex way with the dorsal portion of the fingers. The tendons unite with other muscles to form what is called the extensor hood mechanism. The primary function of the extensors is to straighten out the digits. The thumb has two extensors muscles in the forearm which form the anatomical snuff box. Also present are the muscles located between the index and the little finger which serve as an extra extensor and used for pointing.
Hereunder is a schema from Enrico Aguila[iii] *Module on Anatomy* which summarizes the different muscle groups involved.



**Sensibility of the hand**

The hand is excited by three principal nerves : the median, ulnar, and radial nerves. Each of which has sensory and motor components. The median nerve is responsible for innervating the muscles involved in the fine precision and pinch function of the hand. The ulnar nerve is responsible for exciting the muscles involved in the power grasping function of the hand. The radial nerve is responsible for innervating the wrist extensors, which control the position of the hand and stabilize the fixed unit. This nervous envelope made up of thousands of muscle fibers (sarcomeres) gives the hand its properties to respond to various stimulations, to be excited all along its perimeter and to effect the required contractions and extensions.

A survey of potential actions of the hand

## The pulleys

It is to be remembered that the muscles and joints form a pulley system which is critical to the flexion of the finger. The retinacular system for each of the fingers contains five annular pulleys and four cruciate pulleys. The thumb has two annular pulleys and one oblique pulley. In the finger, the second and fourth annular pulleys are the most critical pulleys as the oblique pulley is the critical pulley in the thumb.

The combination of bones, joints and muscles of the hands form an overall strengthen structure of complementary pulleys which differ in size, shape and possess a variable range of motion depending on the individual's physiological and anatomical makings.

The overall power of the hand or what we call the moment of force is determined by both the force generated by muscular contractions and by the leverage capacity residing at the joint level.

It is to be noted that the hand muscles can cross more than one joint and can at times, be summoned to assist weaker areas. More muscle contractions will provide more power to pull the bones together and reinforce the pulley mechanism. Sometimes, we may detect that there is a deficiency at one of the pulley system as a result of a lesser active flexion of the digit resulting in less strength being deployed. Similarly, when the critical pulleys are injured, there is a compensation mechanism made possible within the system which will call more ligaments to the task of stabilizing the joint by increasing either the tension or compression between the flexor tendon and the bone.

**Difficult choice to make**

As the combined actions follow their courses, the contractions and lengthening of the muscles provide the necessary energy to make the hand close or extend on command. For the judoka, the operations of closure or gripping are essentials to affect the Kumi Kata. The answers to the questions of how and when the judoka makes efficient use of energy will remain his individual decision. He or she can always employ the maximum power of the hand grip or select to exercise it only parsimoniously to match the chosen location of his grip, the angle of approach and the desired speed of his Tsukuri- Kuzushi-Kake combination.

*"Energy is a certain function of a physical system, but is not a thing or substance persisting throughout the changes of the system*."[iv] Bertrand Russell, 1910

**Types of power grips**

The physiologists have generally distinguished two types of grips [v]known as POWER grasp and PRECISION grip depending on how we use the thumb and the digits. (The terms grasp, grip, and prehension are generally interchangeable.)

1. The Power grip can be expressed as being cylindrical, spherical, hook, and lateral prehension. The power grips require that the hand conform to the size and shape of the object. Each finger must accommodate its position to supply forces to counter the external forces of the object.
    - Cylindrical grip: the fist grasps an object and secures it against the palm within a small diameter.
    - Spherical grip: The digits or fingers are more spread apart and the pulleys more extended such as when holding a larger object (basketball).
    - Hook grip: It is a more precise holding action such as when holding a coffee cup by its handle (the person may or may not include the thumb in this grasp. It may also apply to the support or farmer's grip of holding a bucket along side of the body.
    - Lateral prehension is identified when the thumb is adducted.

2. The Precision grip or handling requires exact control of fingers and thumb positions as they are influenced by the size, the nature and shape of the object as well as the change of position in either the space or axis. It is an isotonic participation (relative constant tension while the length of the muscle may change) as opposed to the isometric participation (muscular contraction against a resistance in which the length of the muscle remains the same) as found in the power grip. (The thumb and first two fingers play a different role in the spatial transportation of the object.). Hereunder is a quick view of both. Note that in the precision grip, the object usually does not touch the palm.


Researches into grip strength from a variety of positions indicate that grip strength either increases or decreases depending on the arm position. The strongest grip strength has been found when the arm is extended at 90° before the body, as opposed to other extreme arm positions, such as when the hand is rested at one's side or held straight up above one's head.

Looking only at the biomechanics, it is true that by constantly keeping your hands coiled in the power grip while your arms remain rigid, straight and in parallel to the ground you are capable of deploying maximum grip power.

However, is this continual output of energy necessary? We have to remember that in judo, in order to move freely, we must not telegraph our intentions to the opponent as we need to secure the necessary energy sources at the right time to be capable of defending and blocking oncoming attacks. A soft approach is needed to surprise and elude the opponent as we generate the necessary coordinated impulse to move quickly into the chosen Kake.

*You learn by observation and experimentation. You cannot gain experience just by watching others performed. You have to take part yourself and practice.*

**The different types of grip in contest**

By making contact with the opponent the hands become key conductors to receive and transform energy sources. The general theory is to hold the opponent's judogi lightly before the moment of decision thus making maximum use of sensorial signals and then, transferring the necessary energy along a continuum to enclose the power grip with all the digits performing in harmony to accomplish the last explosive moments.

Defining by what part and when to hold your opponent's judogi will vary according to your intention of throwing, the selected technique, the size of the opponent, his distance and his posture whether your are facing him directly or that he is at an angle to you.

A variety of gripping or holding styles are used in judo contest. We can differentiate those performed around the collar, in the front of the costume, on the sleeves, at the belt area, the armpits, around the waist girdle, the upper arm and loins or a combination of several of these grips. The most popular is the combinations of the collar/lapel with the sleeve grasp using the thumb inside or outside.

It is to be remembered that when you push, pull or lift the opponent with your hands and arms combination, the action can be directed upwards, downwards, straight and sometimes deployed in the form of a circle. It is very important to adjust the power grip to only displace the sufficient amount of force needed to coordinate the joints in the appropriate direction and use only the quantity necessary, no more and not less.

Should you exercise too much strength too soon, you will not only telegraph your intention more rapidly than what you had desired, but your arms may become stiff, sore, subject to cramps and unwieldy thus preventing you to accomplish your goal successfully.

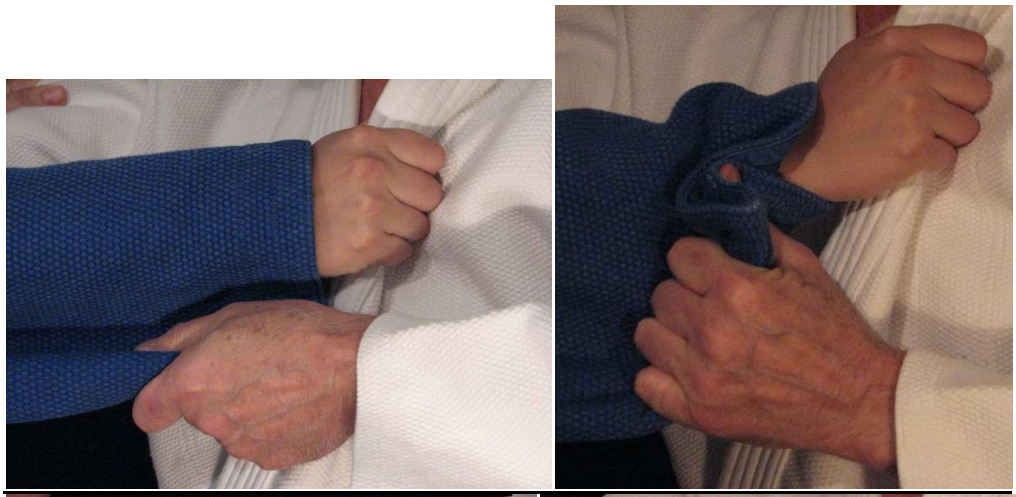
> *"When you take hold of a part of the clothes of your opponent, you should hold him as lightly as possible…if you hold him too stiffly, and your arms once become hardened, you cannot give any more power to them in case of necessity, nor can you easily change your hold"* Sakujiro Yokoyama,[vi]

**Fundamental grip**:

The fundamental grip consist in the right hand of Tori seizing the left lapel of Uke at the level of the collarbone while the left hand holds the advanced sleeve of Uke at the level of the elbow. Some judoka will invert hands to seize by the left.

With further experience, it is possible, to use additional free seizures or grips such as: The right hand of Tori seizes the jacket of Uke under its left armpit. The right hand of Tori seizes the lapel of Uke behind the nape of the neck, thumb inside or outside. The right hand of Tori comes to seize the lapel of Uke. As a mixture, both hands can seize the lapels of Uke at the level of the collarbone or on the same side of the costume. Another method is when both sleeves are taken simultaneously at the levels of the elbow, the wrist or at the end of sleeve.

Hereafter are standards variations of the most current contest grips.



**Thinking about grip training**

It is generally accepted that all aspects of the hand must be exercised to produce a healthy, flexible and strong hand. A variation of exercises is recommended because it has been found that if you only work on closing your grip you will produce an imbalance between closing and opening (antagonist) muscles which can lead to problems such as tendinitis and carpal tunnel syndrome.

If you observe the actions of the hands during a typical gripping action in judo, you will note that the fingers flex to grab a handful of cloth and then they stay flexed. The muscle is contracting but the joint is not moving. That is the main principle of isometric contractions.

Before entertaining a new program to improve your grip, you should consider applying an old training rule which states that if you want to improve in a particular sport, you must practice the various activities of that sport as much as possible. You therefore need to understand the various components of Tachi Waza and if possible, simulate these actions whenever you can.

Improving your grip strength requires a different type of training regime than other muscular training. The reasons are primarily based on the interplay of the tendons and muscles and the lack of "down time" or rest that most of our hands get. Let us review some ways or methods to improve the diverse functions of the hands.

**Various Exercises for developing the grip**

At every session or occasion, try to change your grip in response to your partner size and attitude.

Try re reinforce your fingers-pulleys with the use of a heavy-duty spring hand gripper or soft ball held in the hand. However, instead of just doing closing repetitions with the grippers or squeezes, try to practice to hold the pressure for various lengths of time.

Another exercise is to use a thick training bar from which you can suspend yourself while maintain your grip and perform several pull ups.

Hanging on a pull-up bar with the palms facing away is another great way to build isometric muscle strength. Try holding on with only your fingertips or do shoulder shrugs without bending the elbows.

Another good exercise is to perform fingertip pushups. Perform a standard pushup, but instead of resting your palms flat on the floor, support yourself with your fingertips only.

**Other exercises found to be useful are:**

With the assistance of a partner who is above you, try to hang on his belt or his costume and do pull ups. Do rope climbing or vertical bar climbing. Gripping thick bars or steady objects with of a minimum of two inches in diameter to perform: dead lifts, pull ups. Walking with different weights held in the hands and suspended by your side. Try holding smooth surfaced objects of different weights with the pinching grip. Attempt to lift and swing a sledge hammer using the wrists and fingers. Do wrist curls or regular curls while holding a bar with the fingers on the bottom and thumb on top.

Try picking up pebbles or small objects from a container, training the wrist and fingers and thumb for make a pinch grip. Place your hands in lose sand, rice or other smooth textures and try extending your fingers. Try retrieving small items from different size containers. Make use of self -resistance rubber bands which work the extensor grip. Attempt to do some fist pushups on the backside of your hand-fingers joints. Perform hand stand while leaning against a wall. Do some rope climbing up and down and discovers the joys of kart wheeling.

**Caution**

You have to keep in mind that when entertaining a routine for hand training, you are exercising several segments: connective tissue, tendons, ligaments and muscles. You are principally developing the endurance and the stamina. It is best to have a practice routine which is based upon periods of short duration but repeated frequently. You have to be careful not to overdo your training. The gains may take some time to be evident. Patience and devotion are paramount.

**Conclusion**

As a judoka seeking ways to improve, you have to take responsibility for your training. There are many exercise routines and not all will fit your personality and your physical conditioning. You have to assess your style of judo, identify your strengths and weaknesses and how much you are prepare to endure in your training program. You need to review your goals periodically and adjust you training plan accordingly. It is good to select Tokui Waza early and develop your abilities to perform them in all kinds of situations. Lastly, you cannot improve your skills if you do not practice them.

A good Kumi Kata is essential to perform good judo techniques. As you have already identified, one does not simply grab the costume and hope for the best. You must always entertain a flexible plan of attack or a strategy for defense. As you gain in combat development, you will expand your favorite grip to suit your personality. With determination and courage, you will build up your strength and compensate for your weaknesses.

I close this essay with the encouraging words of the sports psychologist Robert Singer[vii] who said *"Greatness is possible despite apparent weaknesses."*

Have a great training session

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March 2012

## References

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