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Does Taijiquan Work as a Martial Art?

BY C.P. ONG, PH.D.

This question has always lingered as the slow-motion practice cannot be more remote from the speed and power of a knockout punch, but there was never an open discussion as it was deemed irreverent to bring it up. In April 2017, the issue was thrust onto the forefront of Chinese social media when a Mixed Martial Arts (MMA) fighter crushed a self-styled Taijiquan grandmaster in 10 seconds and harangued that Taijiquan combat was mostly fake. In effect, the sacrosanct concept of Neijin (Internal Strength) at the heart of Taijiquan's kungfu prowess, was being derided as bogus. That touched a raw nerve in the Chinese national psyche as Taijiquan is a cultural heritage. The Chinese martial arts community was thrown into a convulsion, with the uproar raging online for months.¹

Since then, many videos have been uploaded to YouTube and elsewhere of Taiji and other kungfu practitioners vying to settle the score by slugging it out with MMA fighters in the gym, but sadly, most were soundly trounced. So, clearly MMA training produces better fighters in the ring. But does this mean that the traditional kungfu form or taolu training has lost its edge?

Taijiquan was created a martial art. Taijiquan aficionados are all too familiar with its much touted kungfu art of yin jin luo kong (leading the opponent's attacking force to emptiness), si liang bo qian jin (four ounces deflecting a thousand pounds), yi rou ke gang (using the "soft" to overcome the "hard"), jie li da ren (borrowing the opponent's force

to strike back), and others. Embodied with these skills "a slower can defeat a faster and a weaker, a stronger." In movies and in wuxia kungfu fiction, we are often thrilled by the depiction of an old master handily beating back a bunch of bullies and hooligans. How can one not be beguiled by the soft training that delivers such mesmerizing kungfu?

The quaint slow-motion practice cultivates qi energy which develops the core strength of neijin.² Qi is the life-force energy which is the mainstay of the theory of Traditional Chinese Medicine (TCM). However, even though qi energy is foundational in TCM healing theory, we cannot find its parallel in Western medical science. Notwithstanding, the body learns to sense and relate to qi in the practice of Taijiquan. (It may help to think of qi as a form of bioenergy for the purposes of this discussion.)

Still, we cannot explain in simple terms what the slow-motion practice is, even though we may have practiced the art for many years or even decades. To say that it cultivates qi and neijin answers and mystifies at the same time. How does the soft training work as it relates to the musculoskeletal structure?

We know the many joys and benefits of well-being that the practice has bestowed us. Indeed, under the present weight of the coronavirus pandemic lockdown, we cope with whatever space there is to practice and keep well.

We know that the practice is a lot more than a physical exercise. We sense the growth

1 Ong CP (2019) *Is Taijiquan a martial art or a dance?* Life Research, 2019, 2(1): 48-51. <https://www.tmrjournals.com/lr/EN/Y2019/V2/I1/48>

2 Ong CP (2017) *A Scientific Perspective of Neijin (Internal Strength)*. Int J Complement Alt Med 5(3): 00155. DOI: 10.15406/ijcam.2017.05.00155 <http://medcraveonline.com/IJCAM/IJCAM-05-00155.pdf>

of qi even as we are murky about its concept. Then over time, we buy into the Taiji package wrapped up in yin-yang metaphysics that shrouds the art.

This is fine for most practitioners who take up Taijiquan for relaxation, health and wellness. Its efficacy as a health therapy is now well established by plenty of scientific research.³ This is a given by the tenets of TCM: A store of robust qi is a good measure of well-being, and practicing Taijiquan nurtures qi. However, Taijiquan is not just an energy-therapy for health, even though that forms the mainspring of its popularity. Taijiquan cannot shed its martial DNA.

Neijin may be esoteric, but its kungfu feats are manifested in the physical state of the body, and are thus subject to physiology and physics. To answer the question we need

3 Wayne, Peter, Yeh, Gloria, Langevin, Helene. (2013) Tai Chi for Health Video. Brigham & Woman's Hospital. <https://www.youtube.com/watch?v=JxpEyhDadrY&feature=youtu.be> A seminar series of the studies of science-based benefits of Tai Chi and Qigong.

to unpack neijin on the musculoskeletal framework, and ascertain the biomechanics of its martial application. For more details of some of the concepts, the reader is referred to the author's recent paper.⁴

WHAT IS THE FORCE OF A PUNCH?

We distinguish the two kinds of forces in a physical action, such as a punch. First, we have the force of the skeletal muscles that produce the motion of the punching action. The second force is created when the motion of the action is obstructed or resisted. This is the force that inflicts damage in combat as a consequence of the collision between the fist and the target object. So, it is not meaningful to talk of how strong a punch is per se. The same punch does not give you the same force. It depends on what is struck.

4 Ong CP (2019) *Taijiquan's Enigma*. Life Research, 2019, 2(1): 31-44. <https://www.tmrjournals.com/lr/EN/Y2019/V2/I1/31>



If the fist is directed at a concrete slab at the speed of a trained karate expert, the slab will break. But if the same punch strikes a pillow instead, there won't be any drama. The pillow would just yield without fanfare. So, if it hits the head squarely, it can result in a KO or a bloody nose, but if it misses, then there is no force to speak of—it remains the motion of a punch.

The force created in a punch is due to a change in its motion, more precisely, its momentum (Momentum = Mass x Velocity). This force is given by Newton's Second Law of Motion:

$$\text{Average Force} = \frac{\text{Change in Momentum}}{\text{Time duration of the change}}$$

To increase the force magnitude in an action, the first order is to produce a larger momentum in the motion, with more speed and/or to involve more mass. The more momentum that can be brought to bear, the greater the force potential in application.

Our body is a structure of many segments linked at the joints, each of which has muscles that can activate independently. For their momenta to align, the segments must not move out of kinetic sequence. However, in the anxiety to throw a fast punch, the muscles closest to the punching action, namely those of the arm and shoulder, tend to dominate, causing the fist to jump ahead in the action. This cuts the muscle power and momentum of the other parts of the body from contributing to the action.

The mental command to strike, more likely than not, does not lead to the segments moving in the right order of sequential kinetics. Our brain is not wired to prioritize momentum in a physical action. Quite to the contrary, the motor-neural circuits often activate muscles that would undermine sequential kinetics and degrade the force output potential.

To induce the desired kinetic sequence, Taijiquan training resorts to the Principle of Three Sections (Sanjie 三节) to regulate the action: "the extremity section leads, the middle section follows/guides, and the root section drives" (shaojie ling 梢节领, zhongjie sui 中节随, genjie cui 根节

摧). In a punching action, the fist as the extremity leads/points, the elbow in the middle follows/guides, and the shoulder, as the root section, drives. This imposes the discipline of the sequential kinetics aligning the momentum of the action.

In turn, action of the shoulder is driven by the power from the waist (dangyao jin 裆腰劲). The turning of the waist-pelvis coils up to the shoulder, where the left and right sides are synchronized to preserve angular momentum. When this happens, the torso turns as a whole, providing the main momentum that drives the hand's striking power. The kinetic sequence aligns the momentum in the motion, where the power action of the waist coils up the chest and shoulder, through the elbow to the hand. At the same time, reaction jin coils down to the feet in the opposite direction to anchor on the ground in support.

THE BODY'S ROTATIONAL MOTION

The body, like any object, has two modes of motion: the motion of its center of mass (CM) which describes the overall motion, and its rotational motion about an axis, which describes a self-rotation, referred to respectively as gong zhuan 公转 ("overall motion") and zi zhuan 自转 ("self-rotation").

For example, when an arm turns at the shoulder, the circular motion, as traced by its CM, is its gong zhuan. Likewise, zi zhuan for an arm is its rotation about the axis along the length of the arm, as when turning the palm to face up to down and back again. In the motion of the trunk, the tracing of its CM moving from side to side, say, describes the gong zhuan, while its turning about the spinal axis is the self-rotation, or zi zhuan. The gong zhuan and zi zhuan of an action must be harmonized for the action to be effective, much like an American football, which must get the right spin (zi zhuan) to achieve a good throw (gong zhuan).

Body motion consists of a series of gong zhuan and zi zhuan of the segments, which must be harmonized in sequential kinetics

to align in momentum. This principle of the body's rotational motion is universal, not just applicable to Taijiquan, but to all martial arts, as well as sports. Force magnitude is essential to excel, whether it be a punch, a golf drive, a tennis serve, a bat swing or a baseball pitch.

To instill the principle of rotational motion, Taijiquan prescribes a foundational "silk-reeling" exercise that works through a series of gong zhuan and zi zhuan. The principle of silk-reeling kinetics is present in all Taijiquan motion. Thus, the practice of Taijiquan forges in the body a comprehension of the silk-reeling kinetics and builds a core strength of silk-reeling energy, called chansijin 缠丝劲, which encompasses this harmony of momentum.⁵

INNER BALANCE

Balance is central in all our bipedal functionality. As a two-legged construct, our bodies are inherently unstable physical structures. We are contending with the force of gravity to keep balance at all times. However, actions in martial arts and sports require more than physical balance. They require dexterity and liveliness of maneuvers at the joints, which sum up to an "inner" dimension of balance. The central mechanism in the development of silk-reeling energy (chansijin) is inner balance.

Consider balance in a simple standing posture. In a medical checkup, the doctor puts a stethoscope on your chest and asks that you breathe in. As you do so, you heave up the chest inadvertently, and end up hollowing the abdominal region. This makes the body top-heavy, and you can be toppled easily with a gentle nudge. While the body is still in physical balance, its inner balance is compromised; the support column of the midsection is weakened internally, rendering the structure less able to keep balance. The body can learn from the top-heaviness as an effect of inner imbalance.

We routinely cause internal imbalance in

the body structure in common actions, such as when we raise a hand high up excitedly to attract attention from afar. There are many combinations of muscle actions underlying a body posture or motion. For mundane activities the differences of the muscle support do not matter much, but in sports they determine the performance. What should be a preferred combination of muscle actions for a given body posture or motion? Taijiquan's answer is inner balance, namely, those combinations with lesser errors of "yin-yang" balance.

A state of inner balance is defined as one that conforms with yin-yang balance, when manifested in biomechanics, is a state where the muscle actions at the joints are neither excessive nor deficient. Inner balance encompasses the full comprehensiveness of functional balance involving the interplay between the forces of muscle actions themselves and with gravity. The art of Taijiquan finds its basis in the principle of inner balance.

Inner balance is deciphered at the joints. To see this, extend an arm out and hold it still. The arm is in physical balance, but the muscle actions supporting it can vary, for instance, when held stretched out or when let to droop. After holding the arm up for ten minutes, tenseness and aches would set in—an indication of excess in some muscle actions. Discomfort from the stress is a symptom of the internal imbalance, from which the body learns to trigger a reflex response of relaxation. Stress at any joint can get some relief by the awareness and subsequent response.

Operationally, the reflex response is a reset of the muscle activations at the joints, which improves the state of support with less stress—a consequence of the law of minimizing energy use in biology. This resettling into another combination of muscle actions is accompanied by an ease of motion flow, which we can learn to sense as qi kinetics and as a biomarker of reduced tenseness.

Taiji training relies on this relaxation to resolve tenseness at the joint, which is a

⁵ C.P. Ong (2013) *Taijiquan Cultivating Inner Strength*. ISBN-13: 978-0615874074 (Bagua Press). Chap 11. Silk-reeling Exercises p. 285.



response “to relax and let go,” or fangsong 放松. This represents the rudiments of a tool to resolve the errors of muscle actions at the joints. The training methodology thus develops the fangsong tool. Fangsong resolution tempers the muscle actions by lessening the excessive ones and boosting those that are lax.

Functionally, fangsong subdues the dominating tendency of the outer prime-mover muscles to pull ahead and allows the inner and deeper muscles to activate in structural support. In this way, the muscle actions are being worked to resettle in a better balance and alignment, for the segments to move in sync and unison of momentum.

Fangsong does not allocate the muscle actions for inner balance. It works by mindfully staying in the middle ground between the stress of excessive muscle actions and the laxness of deficient muscle support. By reducing the margin of errors,

applying fangsong leads to an improved state of balance, with an associated stronger qi. In other words, the more the errors are reduced by fangsong, the more the qi grows. The fangsong tool is organic, ever sharpening and refining, capable of tapering the margins of error in the process that leads ever closer (in convergence) to inner balance.

In the context of using qi to guide our practice, we can view qi as a coherence of bioenergies associated with the kinetics of muscle actions in improved balance, derived from lessening the stress of tenseness or stiffness, and the ease of motion flow and transmission at the joints, together with a better blood flow and perfusion. These are mostly somatosensory data from receptors in the ligaments, tendons, muscles, as well as from pressure and temperature of kinetics (kinesthesia) and from receptors of position in space and of balance (proprioception).

THE PRINCIPLE OF

DANTIAN CENTRALITY

Inner balance calls for fangsong resolution at the joints. But the joints of the body are myriad, and resolving the errors at one can affect others because of the tensile integrity of the skeletal frame. This makes fangsong of the matrix of joints seem nigh impossible.

Now here is where the charm of Taiji pragmatics comes in. The unwieldy task of applying fangsong over the myriad joints reduces to one guided by a centrality principle. Taijiquan simplifies the framework of joints into three pairs for fangsong to work through systematically. The major three pairs are: the shoulders and hips, the elbows and knees, and the hands and feet, which can be further subdivided in refinement. As we shall see, this leads to an elegant centrality principle that regulates the Taiji training for cultivating inner balance.⁶

The waist-groin junction enjoys an eminent status because the generation of waist power relies on the torque action and reaction at the junction. The functional significance is the transference of forces between the body and the ground, and the junction demarcates a proportionate distribution of masses between the upper and lower body.

Taijiquan refers to this waist-groin junction as the kua (胯), which represents the complex consisting of the pelvic girdle and the triangle of joints—the hip-joints and the sacral-iliac joint (SIJ). The midpoint of the kua junction serves as a center of reference for fangsong resolution to guide the resolution at all the joints. This coincides with the energy-point known as the dantian 丹田 (“field of elixir”), described traditionally as three fingers below the navel and a third of the way inside. Note also that the dantian location is approximately the center of mass of the body in a horse-stance posture.

By referencing to the dantian, fangsong resolution tempers and works on the yin-yang balance of the muscle actions at the kua triangle, thereby operationally developing

6 C.P. Ong (2016) *The Central Status of the Dantian*. The International Magazine of Tai Chi Chuan, Spring 2016 Vol. 40 No. 1. www.Tai-Chi.com.

the centrality of the dantian. Also, the qi, cultivated at each joint relative to the dantian, nurtures a kinetic connectivity between the joint and the dantian. Consequently, a web of qi-connectivity of the joints centered at the dantian builds throughout the body. This forms the concrete basis for the principle of dantian centrality in the body. In this way, the intractable problem of fangsong of the myriad joints to cultivate inner balance is resolved and reduced to the centrality principle of “establishing the central status of the dantian.”

The bio-mechanical significance of establishing dantian centrality (dantian wei hexin de xing cheng 丹田为核心的形成) is the fruition of the SIJ hub principle—“the hub of forces transferred from the trunk to the ground and vice versa” (Lovejoy, 1988, Aiello & Dean, 1990). This enables the pelvic platform to serve as a conduit of motion and loads between the spine and the legs, which are described as the three levers by Vleeming.⁷

In the qi paradigm, the constant attentiveness to the dantian and particularly, the fangsong at the SIJ and hip-joints, induces the qi energy to collect in the lower abdominal region, concentrating at the dantian. In time, the nurtured concentration of qi culminates as the “fullness of dantian qi” (dantian qi baoman 丹田气饱满). The fullness of dantian qi gives the body a deep experiential appreciation of the centrality principle. With this achievement, the body is said to be invested with the principle of centrality. Its attainment represents the maturity of inner balance and mastery of the art.

The upshot is that the body’s neijin is imbued with inner balance. The force that ensues from the body’s action is a vector of the right “softness” and “hardness,” and enjoys the unified momentum of well-ordered sequential kinetics. Inspired by yin-yang balance, the force of neijin is lively

7 A Vleeming, et al. *The sacroiliac joint: an overview of its anatomy, function and potential clinical implications* J Anat. 2012 Dec; 221(6): 537–567. Most of the discussion here on SIJ are based on this paper. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3512279/>

and agile—able to change spontaneously to combat situations.

THE ROU (SOFT) AND GANG (HARD) OF NEIJIN

The key to the effectiveness of a kungfu technique is the response of the right force vector applied with the right postural setup for delivery or for leverage. This is apparent in the close-quarter fighting skills of wrestling, judo, grappling, and joint-locking techniques. To execute an armlock in practice is one thing, but quite another under the pressure of combat. One must be able to maneuver to apply leverage on the fly, according to the changing conditions, and keep control in balance. Uncannily, that is what neijin born of inner balance offers as a matter of course.

Infused with inner balance, the body is very conversant with movements at the joints, so can undergo change spontaneously in response, with ease and at will according to the loads—a quality which describes the soft (rou 柔) character of neijin. With sequential kinetics, the body's momentum is unified in action, which depicts the hard (gang 刚) character of neijin.

The liveliness (ling huo 灵活) of neijin is the interplay of its dual characters of soft and hard. This means that, in the interchange of softness and hardness, the body can change and maneuver with spontaneity according to the changing demands of the combat situation in application (sui ji ying bian ling huo yun yong 随机应变灵活运用).

The rou (softness) gives changeability to respond with a force acting in the right direction and the gang (hardness) gives the force magnitude by the unison of momentum. The duality accords precision to the kungfu maneuver, which makes the effort in the response appear “soft,” in contrast to the strenuous exertion associated with brute force.

In short, the advantage of neijin is that the Taiji body knows to deliver the right combination of rou and gang, as a reflex response that manifests in action of the right

force vector. This is what enchants us as the magic of Taiji kungfu touted in the classics.

For instance, in the skill of “leading an opponent to emptiness,” the body responds with rou-softness to absorb the incoming force but with sufficient gang-hardness to stay in balance, and when the attacking force is committed, the body would turn with ease at the kua pivot, leading the force to slide off to “emptiness.” Note that if one's core strength is not sufficiently developed, one would be shoved off before any technique could come into play. Also, if the neijin were not mature, one would have to fight back in an effort to keep balance. This would lock up the body, rendering it unable to turn at the waist. The maturity of neijin accords a springy liveliness (song huo tan dou 松活弹抖) and a natural ease of turning (yuan zhuan zi ru 圆转自如).

The skill of “borrowing the opponent's force” is simply taking timely advantage of the opponent's faltering momentum. And the skill of “four ounces overcoming a thousand pounds” is a statement of using leverage. But in order to move a thousand-pound load with the fulcrum placed half a foot away, the lever would have to be at least 2,000 ft long, which clearly would be impossible to emulate in the human body.

The leverage, of course, is not linear, but that of “coiling” (chanrao 缠绕). If the opponent is holding the tip of a screw-driver but you are controlling the handle, you will prevail with a small effort, no matter how strong he might be. The control at the kua is like the control of the screw-driver handle, which enjoys the tremendous advantage of coiling leverage.

Fajin 发劲 is an explosive release of jin energy at an extremity, like the crack of a whip. Fajin is activated by accelerating the Taiji motion, like stepping on the gas pedal in driving. But the body must be well regulated by the principle of inner balance. Otherwise, it would be like a sputtering car, out of tune and out of alignment. With the segments linked in kinetic sequence, the release of jin power is as frightfully explosive as it is graceful, as witnessed in Chen Xiaowang's

signature fajin.⁸ However, without the rou-soft alignment at the joints, the momentum would not transmit in the sequential kinetics. Fajin exemplifies best the gang-hardness of neijin.

The rou-softness of neijin is best manifested in qinna 擒拿 (joint-locking techniques). The rou jin accords liveliness to the movements at the joints, allowing the body to flow with the qinna pressure by the opponent. For example, if the wrist is qinna-locked, a change can be effected at the elbow or shoulder to relieve the pressure and to escape, with the option to launch a counter-qinna. The skill of qinna is as much to joint-lock an opponent into submission, as it is to escape from one and to counter-qinna.

CONCLUSION

Through the lens of biomechanics, neijin's kungfu techniques are no mystery. However, kungfu techniques are but one part, though a major one, of fighting. As great they may be, their effectiveness depends on how well they are applied in a real situation, outside of the familiarity of the training environment. Thus, it is the fighter, not the kungfu techniques and strategies, who must carry the day in the ring. Simply put, can you exploit the opponent's weakness with the strength of your skill set? Can you take timely advantage whenever the opportunity presents?

In other words, no matter how great your kungfu style is, without real fighting experience, you would be vulnerable to a strike flying out unpredictably from an MMA fighter. The ignominious incident of the MMA-Taiji scuffle forces us to confront whether Taiji kungfu is bogus.

The more relevant question should be: Does one's kungfu have substance? Is it "empty" (kong 空)? Is it of martial (wu 武) substance or a flowery dance (wu 舞)? More specifically, is the practice developing the core strength instilled by the universal principle of sequential and rotational kinetics that induces whole body momentum and comprehensive balance? Unfortunately, this question is seldom raised in a positive light of review. To say that that one's form practice is "empty or hollow" (kong jia zi 空架子) is a most stinging critique. All the same, it is imperative that the issue be raised to evaluate how well one's practice complies with the biomechanics of inner balance. The years of practice have only a second of glory to shine in the ring!

Modern Taiji practice is of course not pivoted to martial arts. Whether or not you are in quest of kungfu, the form practice aims to resolve yin-yang imbalances, which nurtures qi and cultivates a comprehensive balance. To scale the heights of kungfu prowess requires dedication of time and effort under proper tutelage to develop the requisite core strength of neijin. However, it does not take long for practitioners to enjoy the qi benefits of health and well-being. The constant tempering by fangsong resolution to balance reinforces the body's gait, and builds confidence of mobility that elderlies hold dearly. And most importantly, one gains the most cherished prize of all: Bliss and tranquility, which flow from the meditation discipline of mindful attentiveness to the practice.

⁸ Chen Xiaowang's signature fajin: <https://www.youtube.com/watch?v=5LosS2vjmek>