

# The Dynamic Balance Training Instruments

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**Abstract:** Based on the author with the technical background and studies *TaiJiQuan*, push-hand and boxing nearly three decades experience; early in the end of 1983, the author got the nationwide champion on 60kg push-hand competition in Taiwan, ROC, (See Fig. 01 & Fig. 02) only by one and half a year push-hand practice without accepting any other martial arts training experience prior. Also through martial arts practicing experience and with the psychology experience of the author, concludes that the mass majority couldn't get effective promoting on his fighting ability, is based on the learner's worse mindset of the resistance that generate naturally by human-human practice mode, then the author tries to solve this problem of almost each learner certainly occurred within real practice. With a life time studying, the author with thorough understanding the essence of 'the science of fighting techniques' then makes the scientific definition of the 'in-fight', and 'out-fight'. Then from the above definitions drive out the fundamental theories. Again based on these fundamental theories, the author through the research and development then invented the elementary and professional training equipment of 'the science of fighting techniques' that is 'the dynamic balance training instrument', which is able to use in broad range of training on all kinds of fighting techniques in the field of dynamic balance training. Caused by quoting the human-mechanism mode with the dynamic balance training instrument for the contestant training, is naturally and effectively prevent the necessarily and abiogenetically resistance mental state at human-human mode, it is easy to get valid improvement in the field of dynamic balance training. In future, this training concept and instrument it will force the contestant without any other choice to accept dynamic balance training, otherwise he is unable to stand still on the game field definitely. In 2008, because China sponsors the Olympic sports games in Beijing, the author ahead of time already with lot efforts through various different conducts tried to inform the leader of China, with this invention related theories and training implementation time schedule. But the decision maker of China government might not with the opportunity to receive this information; thus could not value this invention which is able to bring many extra medals for China in the Olympic 2008, also might not have the ability of foresightedness cognition this invention can make such enormous industrial system and huge commercial benefit to China. At here, the author is the first time to open this cooperation opportunity to all other nations in the world and any international enterprise that value this invention.

**Keywords:** martial arts; dynamic balance; training instrument; fighting techniques; Taijiquan; in-fight; out-fight;



Fig. 01



Fig. 02

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## 1. Preface

Since the earth contain living creature, between the different species, has formed the food chain. Any sole species looked through the food chain in that, within individual and individual, or between group and group, endlessly has the conflict, if is not for looting the food or expanding the survival space; is for multiplying greatly the posterity, in order to extend descendants on behalf of whom selves the exist foundation. Therefore, it formed the phenomenon of the stronger dominate the weaker. The time does not yet have the full evolution on civilization, one meet the event of conflict, if without sufficient self-defense ability, no matter is individual or group, usually all is differentiated on surviving and death, this kind of phenomenon still exists up to now on earth, it is unable to completely improve because of the evolution on civilization.

Therefore, in regards to group, forms the region which people lives, the same blood relationship, the common culture, unanimous belief multitudinous individuals, gathering to compose the organization namely the nation, and developing self-defense military force; in regards to individual, has many people to be engaged in the learning of martial arts, no matter of barehanded or by weapon, expected any might not be anticipated in the future in the conflict will survive or with sufficient self-defense ability. If discusses barehanded martial arts, in world the different country all respectively has its own different developing appearance, the development of martial arts in China also becomes a system, approximately it may divide into In-Fight and Out-Fight.

## 2. The definitions on barehanded fighting techniques (martial arts)

On martial arts, two opponents engage mutually, the fighting will, the fighting strategy, the exploding ability, the continuing ability, the fighting skill etc., all respectively holds different domain, the fighting will and strategy are belongs to psychological portion, the exploding and continuing ability are belongs to the physical portion, as for the fighting skill then as above describing, has In-Fight and Out-Fight two major categories, at here simply discusses the fighting skill aspect.

However the author although with literati practice martial arts nearly three decades experience, cause of originally with the science and engineering background, there was related experience of psychology also, even makes a deep study in the theories of martial arts and actual fighting training and teaching more than two decades, adds the author to read a lot of martial arts books, never saw anyone to define as follows and with elaboration, now the author tries to define, and elaborate its theories.

As described on above, barehanded fighting techniques can be divided into the In-Fight, and Out-Fight; in fact it is not only to classify in China, for example, the barehanded martial art(Boxing) in western world is also having: In-Fight, and Out-Fight discrimination.

### **The definition of Out-Fight:**

So-called the Out-Fight is as two opponents engaged mutually with the conditions of that their bodies without keep any contact to his opponent at any portion. Does not destroy the balance regard to his opponent as primarily, only by hands or feet, mutually launch attacks, in order to cause his opponent suffer the damage at his attacking point, with the result that his opponent loses the ability to offend and defend.

### **The definition of In-Fight:**

So-called the In-Fight is as two opponents engaged mutually with the conditions of that their bodies kept in contact to his opponent at any point during fighting. Destroy the balance regard to his opponent, and cause his opponent falls down as primarily. With arrest his opponent's joint for next, then by hands or feet, mutually launch attacks for assistance, in order to make his opponent falls down, joints been counter-locked, acupuncture points been controlled or suffer the damage at the attacking point, with the result that his opponent loses the ability to offend and defend.

Above discussion about the definitions on fighting primarily is purely about the mutual attack at standing posture. In addition, if after them fall down to the ground at the lying down posture mutually attack, that is groundwork, also has related development, then to be not discussed here.

## 3. The analysis on time difference about visual sense and touching sense

According to the definitions described on above, because the Out-Fight boxer who engaged mutually to each other, without any contact to his opponent, so his attack and evade movements against his opponent, depends entirely on the visual sense as the only consciousness way. Because the light speed is extremely fast; therefore, people recognized with mistake, cognizing the action of his opponent with the visual sense by eyes

is the fastest mode; this actually is completely wrong cognition. Why it is wrong? There is no doubt the light speed is the fastest, because the biological development of the living creature evolution, the development of the visual sense is at the period later compared to the touching sense. Although the eyes already sensing the changes of light, but the visual region in cerebrum occupied portion broadly to other senses of feeling; to form the significant cognizing, the received information processing time must pass through cerebrum processing, then to generate the correct reaction to respond, needing to take much longer time.

However, the In-Fight is quite different, two opponents mutually fighting together, because they maintain bodily contact condition against each other, the touching sense then becomes another major mode to conscious the action of his opponent. During the creatures development, for comparison, the touching sense, which is earlier, and in lower level, compared to the visual sense, therefore as the skin with such vast area, it takes the processing region of cerebrum, is unexpectedly far smaller than the vision. In addition, through the expert by a long-term training, the information from his touching sense even needs not through his cerebrum processing then is directly can get the correct reaction by way of his spinal cord. Corresponds to the action of his opponent, his responding speed is far rapid from the visual primarily as the Out-Fight boxer comparatively.

In the physiology, regarding to the central nervous system can be found the following Fig. 03. In Fig. 03, it shows the Central sulcus, can be divided into two portions of Motor control (front area) and Touch and pressure (rear area).

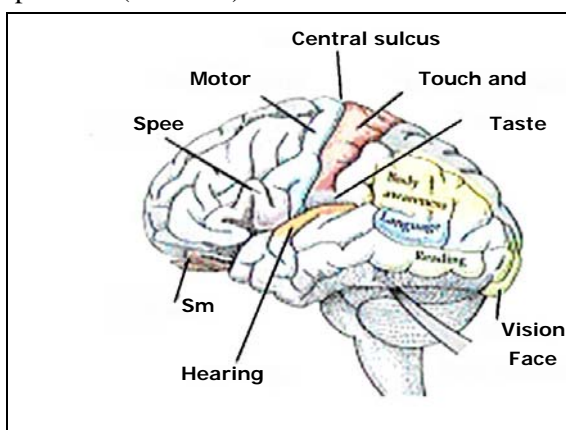


Fig. 03

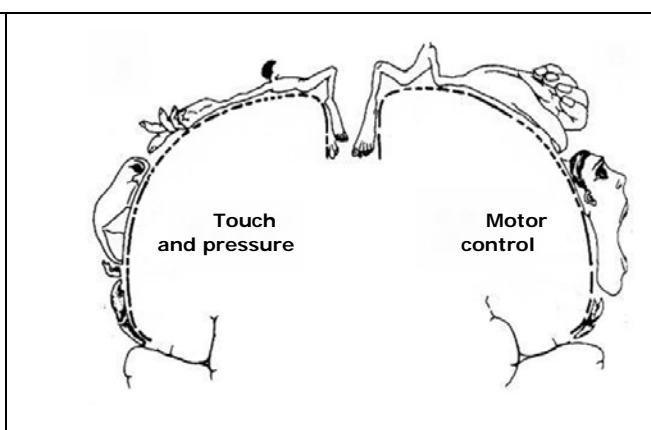


Fig. 04

In Fig. 03, The Central sulcus is composed by two portions the motor control portion and the touch and pressure portion. In Fig. 04, it pointed out the Central sulcus corresponds to bodily for each region, the region has the size difference, responded the functions of motor control and touch and pressure; the wide range point out to process a large amount of information, its function is more complex, therefore it also takes more time. Through Fig. 04 it may obviously confirm that the entire body occupies the relatively unusual small region. This is one of the rationales, which the author presents the argument that rests on.

#### 4. The information and difference from the thought of cerebrum activity and the spinal cord reaction

Particularly, certain person who is completely understood the In-Fight theories. Through long-term unceasing practice, causes his skin sense promoted significantly, if his opponent by the cerebrum activity, this is so-called mind or thought activity, directing his body makes offend, defend or dodge hides action; before his offend, defend or dodges hides action not yet launched, his body already transmitted out the information. This information, the Chinese or novelist commonly named it and pronounced it as '*chi*'. In-Fight expert has long-term actual fighting experience, can clear read out this information, from it to understand the follow-up action mode of his opponent, then took the corresponding action of offend, defend or dodges hides and so on; this kind of information reading ability in *TaiJiQuan* is called as 'Listen-Ability' (*TingJing*). Certain In-Fight expert with subtle sense, can sense it through on his skin hair, therefore the Out-Fight boxer is obviously and usually full of bellicosity, but the In-Fight fighting expert instead is good at going into hiding his thought and makes it invisible.

But if the generated action of his opponent is belongs to the spinal cord reaction by himself, the body of his opponent without any information comes out, therefore there is no any fighting expert to be able to sense and to read it. So whichever a boxer, if he accepted exactitude and long-term training, until the action of his

spinal cord reaction can be generated, and becomes to his nature response, then his action of offend, defend at this moment, all is by the action to respond to his opponent and is turning into the natural response. Particularly, if his action is belongs to the nature response. In addition, it is generating due to responding his opponent with big or strong action. Thus his opponent with this big or strong action, cause to slant and his center of gravity to be out of the supporting area under his feet standing. Therefore, this kind of natural response which occurs this action, is completely unable to read out and sense, so his opponent completely is not able to crack it, certainly his opponent is placed in the balance destruction situation immediately by his opponent own action and it cause his opponent himself to fall down or under defeat situation.

Comprehend to this extent, if anyone can understand the time difference of the visual sense and the touching sense, and the difference of the activity by brain consideration and the spinal cord reaction, then when two boxers engaged mutually, which one is faster or slower than the other is. Is that obviously to be determined?

## **5. The difference between Static balance and Dynamic balance**

Through above analysis, therefore the Out-Fight boxer, often practices to strike hits, in spite of alone or mutually, repeatedly practice the striking style, expected can speed up his striking rate, take achieves the intuition response as a goal. However, usually does not consider the balance problem. If he calculates the balance problem into consideration, it only just under the situation that is without the interference by his opponent, to all of his actions by himself and by the only existence of gravitational force, he considers only the static balance. Moreover, due to above comparison about the senses of vision and touching, his reaction time definitely far slower than the In-Fight fighting expert does.

In-Fight, then under the condition in keeping contact with the body of his opponent at any portion, mutually practice: pushing, wrestling, capturing, holding and so on, with expectation can destroy the center of gravity and the balance of his opponent. When severely, it will cause his opponent to fall down, when slightly it will cause his opponent unable to apply a force out as his own will or properly to offend and defend. And further, because when his opponent applying a force out, the applying point, the applying direction, the force magnitude, the applying time and so on, all is moreover as random and time variant as the will by his opponent. Therefore, the training goal then emphatically to, besides the fixed invariable gravity, also caused by his opponent applying force to cause to his body as the balance influence with the least change into the principle to carry on. Thus, the training goal is toward on the principle of keeping the dynamic balance.

## **6. The cultivating time of spinal cord reaction**

For any kind of reaction training, all needs sufficient time to cultivate right and natural response, to take English typing as an example, people almost are not from childhood to get English typing training. However, if gives sufficient training time, slowly practice from the start, gradually speeds up, most importantly, for each punch all must be correct, after three months later, bad habit will be eliminated, after six months, can cultivate good habit, after a year, will completely produce natural response.

Martial art training is not exceptional. Regarding these trainee accepting martial arts training, if gives several hours per day with sufficient dynamic balance training, after three months, bad habit will be removed, after six months, can cultivate correct habit, after a year later, will completely produce natural response either. This training time, in regards to martial arts training, may say that it is quite rapid and effective.

## **7. Why In-Fight is better than Out-Fight?**

According to above discussions, if a martial art trainee accepted sufficient dynamic balance training, namely the In-Fight fighting expert, if the other martial arts trainee without accepting any dynamic balance training, namely the Out-Fight fighting expert, they engage and fight mutually. Also if this In-Fight fighting expert can sufficiently and completely to understand martial arts theories and can keep contact with his opponent as necessary, then this Out-Fight fighting expert, because his sense is slower also is unable to obtain immediate dynamic balance, therefore is unable applying suitable force out or to offend and defend. However for the In-Fight fighting expert, because his sensitive sense, precognition and the accuracy of his instantaneously judgment, dynamic balance and reaction rapidity etc., all is distinctly outstanding compared to his opponent, therefore he is quite easy to launch effective attack, obtains certainly superior on integrity.

Therefore, in the 'fighting techniques' domain so-called rapid and slow, which is relative, and by the

physiological sensation. Although by the present science and technology, may use the high-speed camera, then to make the low-speed playing, for the analysis after the event past. But, at the actual fighting, one by his opponent attacking with fists on body, or he attacking with his fists on the body of his opponent, that kind of feeling is true, is real time and immediately, is also the present technology disability and unable to measure.

Generally, pure Out-Fight fighting expert, cannot consider definitely launch the integrity attacking impact of his hits. Therefore, he launches an attack is good at with the extremity (limb) strength. Expected with the speed of his attacking point, causes the damage by the attacked point of his opponent. However, the *TaiJiQuan* is then otherwise. One with the arms level extended, only a little bit rotating hips, and then the speed of the endmost hand is moving fast. In addition, *TaiJiQuan* always destroys the balance of his opponent as primarily. It affects his opponent use his limb strength cannot as will. Moreover, if the opponent has not practiced *TaiJiQuan*, then his entire physical strength in the situation under balance destruction, also cannot be using, by now to attack the opponent, was similar as to hit the fixed target, must struck the center in any time, knocks out only need and by one single shot. *TaiJiQuan* in Chinese traditional martial arts was a remarkable real case of In-fight.

The *TaiJiQuan* slow practice method, only lies in passes through this training method, expecting achieved the integrity of the whole body harmonization as a goal, the so-called one point move then with the whole body move, one point static then with the whole body static, is this meaning. So long as one could finish the integrity of the whole body harmonization, between fast practice and slow practice, in essence certainly without any distinction.

## 8. Systemize the integrity of ‘the science of fighting techniques’

Especially early before the author issued, in spite of in China or in other foreign country, have never seen anyone to make this fine research, proposed publicly above many viewpoints and theories of science to systematize the essences and contents of ‘the science of fighting techniques’, are certainly very difficult to have the breakthrough, no matter can synthesize overall many viewpoints on above, then to invent this ‘the dynamic balance training instrument’ never being seen before, of which the martial arts training instrument regarding the In-Fight basic theories as fundamental.

Moreover, the former fighting expert who accepted the martial arts training also is not necessarily professional in the field of science and technical engineering, the physiology of exercise, the psychology, the Arts of War (*BinFar* wrote by *SunTsz* in ancient China) and In-Fight martial arts(*TaiJiQuan*) etc., knowledge’s of such various aspects, thus it is very hard to unify and to integrate; so it cause the research regarding to this aspect been always hard to be breakthrough; for several thousand years, in this domain, no matter in China or other foreign countries, were still a blank.

In this technical developed today, about ‘fighting techniques’ each category although got some people do the research in different field, but the research in the center core of entire field of ‘the science of fighting techniques’, it is unpopular and receives no attention. Many intelligent outstanding person, all in other popular different professional science and technology field to make research on theories or applications, they did not pay their attention to ‘the science of fighting techniques’, therefore the essential cognition on the true nature essence of ‘the science of fighting techniques’ is fully insufficient.

Therefore, the author makes immeasurable mental efforts to the dynamic balance training, finally bracelet almost all studies must have to meet the fetter and frame by the psychological barrier, in the center core of entire field of ‘the science of fighting techniques’ have made a significant breakthrough, produce an epoch-making innovation-‘the dynamic balance training system’. This business secret, except described the details with diagram and text in the specification of patent application, with its theories of explicit description, its substantive contents is the first time in the world to be exposed.

## 9. The relations of right mindset on push-hand practice of *TaiJiQuan* and dynamic balance with Listen-Ability

In the *Taijiquan* training, a center guiding ideology that is ‘Abandon the subjective of one’s ego instead as a follower.’ So-called ‘Abandon the subjective of one’s ego instead as a follower.’ is when refers to the martial arts training, specially refers to a mindset when push-hand practice of *TaiJiQuan*. Why has to maintain this kind of mindset? Because only maintains this kind of mindset in the time during push-hand (*TweiSou*) practice, can achieve ‘contact (*Tsan*), stickiness (*Nian*), continuous (*Lian*), follow (*Swei*),

without separation and conflict (**BuDioDing**). In addition, all of these about 'contact, stickiness, continuous, follow, without separation and conflict', is the precisely index to measure the quality or ability of the Listen-Ability in **TaiJiQuan**.

However, what is the Listen-Ability? The Listen-Ability is a kind of ability by way of the skin contact on bodily surface, and then infers the idea and attempt of the innermost thought of his opponent. In here, the author must introduce some knowledge and concept within modern physics to explain it.

First, is the concept of vibration and resonant. In the mechanics, the electricity and the optics, all has the vibration concept. For example, a tighten string, we plucked it by finger, it can have the vibration to emit sound; if by side has a string which basic vibration frequency is completely the same, then it can produce so-called resonant phenomenon, causes the second string to send out completely the same sound with the first one.

Next, the author makes the example with the wireless radio or television. If regarding the broadcast of the amplitude modulation (AM) as example, and if the weak high frequency carrier that received by the antenna of the local radio, it passes through the local tuner receive; lets the specific frequency enter the radio-frequency amplifier to enlarge, then through super-heterodyne decline it to the intermediate frequency. Again demodulate it to low frequency signal, after sends it to the power amplifier, through the loudspeaker the sound production; it causes us to be allowed to hear the same sound as from the transmitting station. In this case, the local tuner received is similar to the above resonance effect. In addition, it is as 'contact, stickiness, continuous, follow, without separation and conflict' in **TaiJiQuan**. We can hear the sound, which is broadcasted from the transmitting station. It is the Listen-Ability (**TinJing**) in **TaiJiQuan**, also it is in local can receive the primitive sound which transmits from the transmitting station at far distant place, that is harmonizing after the hands contact and the opponent action infers the thought in his opponent mind.

Come again, we may quote the synchronization concept of the television. The person who having ever learned the television principle all known the synchronization concept, the appearance of the television can use the field and the frame of the diagram becomes the animation; for each field and frame also had many scan lines. for system NTSC and PAL, frame number and scan line number also were different; no matter how, each system, it respectively did have the vertical synchronization signal and the horizontal synchronization signal, if it was un-synchronization, the television picture on disorder; if it was synchronization, the television can receive the picture integrity which transmits from the launch present. Here, the synchronizing signal is 'contact, stickiness, continuous, follow, without separation and conflict' in **TaiJiQuan**; and the animated picture integrity presents, is the Listen-Ability in **TaiJiQuan**.

Thus, it is in the receiving end tuner, receives different channel, must adjust the tuner to be harmonic with the transmitting station as the same carrier frequency, otherwise it is unable to receive the signal; and this frequency channel, is leading by the transmitting station, the receiving station is following. Therefore if anyone wants training himself to get the subtle Listen-Ability and the excellent dynamic balance ability, that his own mastering prejudice is too strong, is certainly getting nothing from the practice. This certainly is the main reason of the majority people who practice the **Taijiquan**, but only has such a few to be able to become the outstanding In-Fight fighting expert. Therefore, we must and only practice through push-hand by way of maintaining the good mindset of 'Abandon the subjective of one's ego instead as a follower.' In order to developing the subtle Listen-Ability and excellent dynamic balance ability, then read out the thorough intention of opponent at any time by Listen-Ability and respond the actions of opponent by nature and proper dynamic balance.

## 10. Graphical illustrating the dynamic balance and some other basic concepts that derived from **TaiJiQuan**

In Fig 05, it shows a navigation compass, when ship navigates on the ocean surface, because it receives the influence by the ocean waves, regardless of the ship swaying, at certain instant, as the stand of compass moves from original position (dashed line) to new position (solid line) by the incoming force from waves, the compass itself upward surface, still maintains its original upward direction, does not receive the change. It is an example to illustrate the dynamic balance concept.

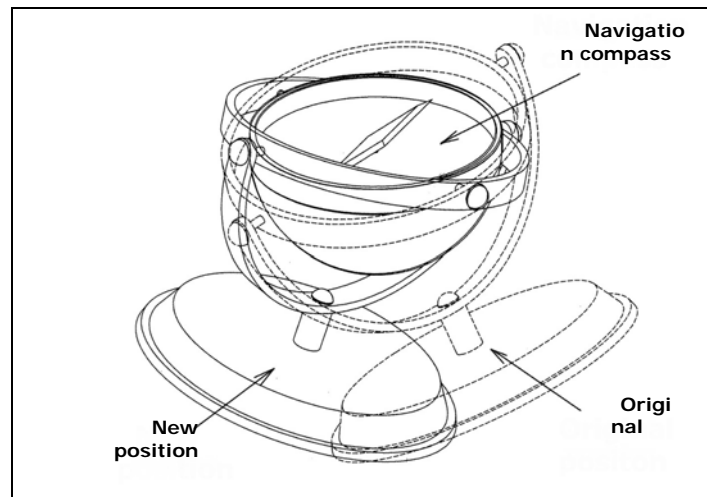


Fig. 05

If we use a block to symbolize the human body from the shoulder to hips portion, and with three orthogonal axis's stand symbolizes the human legs as shown in Fig. 06.

In Fig. 06, the left hand side shows a block supported by a stand with three axis's perpendicular to each other in static, the normal vector perpendicular to the front face of the block; the right hand side shows an incoming force vector from his opponent launch out against the front face of this block at a certain point, then the block its normal vector with a circular moving to release the incoming force and disturbed his opponent's balance immediately, is an illustration on dynamic balance.

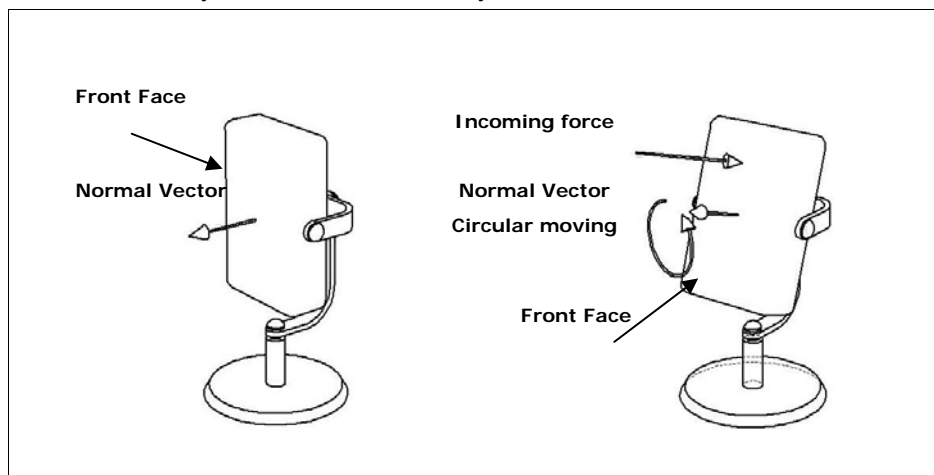


Fig. 06

Another concept of *TaiJiQuan* is relaxation(*Swon*); it is with the meaning of to release all tensions of the limbs except the necessary forces that support for standing. For instance illustrated in Fig. 07, by using the rocking drum for kids playing, drumsticks as two upper limbs of human body, left hand side shown it in static, right hand side shown when the rocking drum is rocking, the drumsticks swinging to follow and to be derived by the drum's rotation correspondingly. It is by the way of relaxation to transform the incoming attacking linear momentum or kinetic energy to the rotational momentum or kinetic energy and let it to be harmless.

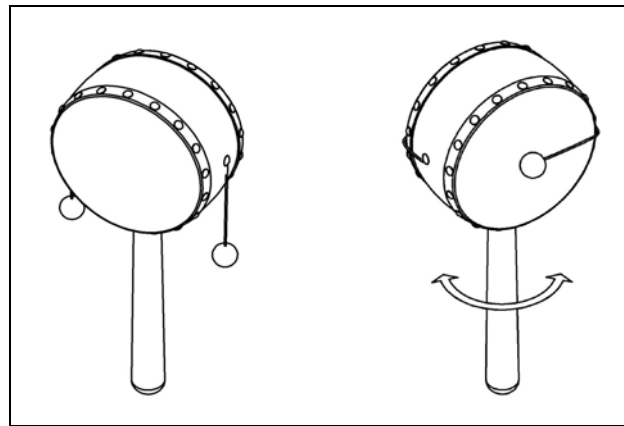


Fig. 07

## 11. The practically new question and its solution

Though, from above discussion, theoretically could effectively solve the problem of the mental obstacle it grows from the human-human mutual training mode on fighting techniques. Actually, how could do it, then to be able to achieve the theoretically pre-designed goal, it becomes a new question. Fortunately, based on the physical foundation and background on technology of the author, this question also got real solution. This solution will be classified for business reason and to be described in the patent specification and claims.

## 12. The diagram of the ‘dynamic balance training unit’

This ‘dynamic balance training instrument’, at here we treat it as a single unit that is the ‘dynamic balance training unit’.

In early days, the techniques development on computer science and internet were not as today, and then the author quotes the pure electrical-mechanical system:

Fig. 08 shows the diagram of a ‘dynamic balance training unit’. It was comprised of three subunits that include: one mechanical energy transferring, one three dimension driving, and one body holding, the other additional one with shaded block and dashed line is peripheral.

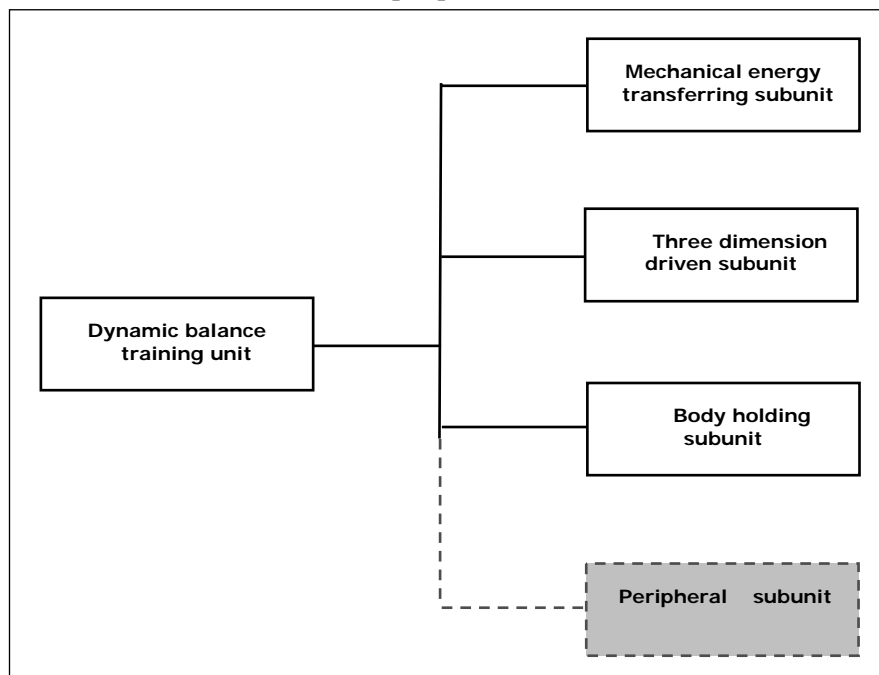


Fig. 08

In Fig. 08, these three subunits that are assembling together, it possesses the basic function of ‘dynamic balance training instrument’, in other words it provides the essential ability or the core function on the necessity of dynamic balance training.



An mechanical energy transferring subunit, it transfers the electrical energy to mechanical energy for further use. At here, use a motor with corresponding slow down gear set is sufficient for this purpose.

A three dimension driving subunit, it is able to generate or to convert the input rotational mechanical power to true three dimensional (3D) mechanical power output to the trainee for dynamic balance training purpose.

A body holding subunit, it secure the three dimension driving subunit to the body of trainee, continuously to transfer the true 3D instantly varying force to interfere the dynamic balance of trainee on standing posture, and with a safety belt to prevent the trainee get injured from falling down it cause by losing balance accidentally.

In Fig. 08 the other with shaded block and dashed line subunit is the peripheral components to form other extra functions to assist the basic function it mentioned on above, let the 'dynamic balance training instrument' possesses the extra ability on classifying the fighting ability of trainee or instantaneously video monitoring the training condition of trainee.

Nowadays, cause of the technology and science progressed more then ever, also with the internet fully developed. Thus the above mentioned pure electro-mechanical system, by quoting the computer for local central control, and it connected to far end by internet, in any time reporting to the far end control center the real time situation of trainee with corresponding parameters, it can achieve the goal on combination the training and evaluating together.

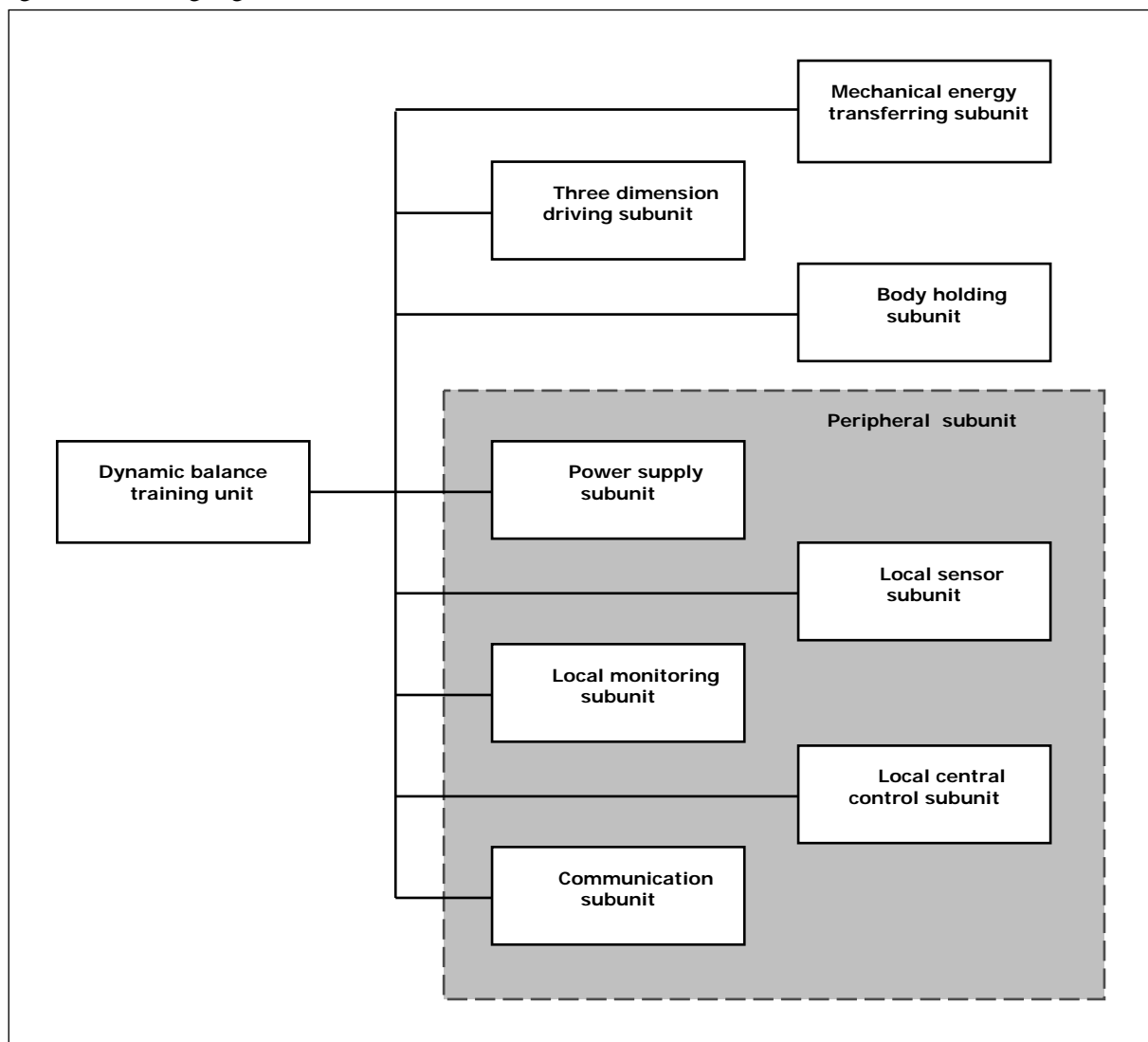


Fig. 09

Moreover, at local end, by quoting with the computer and the peripheral devices such as contact pressure, accelerating, position and angular displacement sensors etc, the original design of the electrical-mechanical system, it can be absolutely modified by a wholly new design. Then this dynamic balance training unit can

generate the programmable output force. It is not only more flexible on application; but it is also practically maneuverability that it can be adjusted depending on the trainee's real time situation and response.

Beside this, except above mentioned purpose of the combination on the training and evaluating; by the connected through the internet, more over it increase the new function on far distance simulated fighting ability.

Thus, it can be modified and as shown in Fig. 09, where the shaded block with dashed line it shows as a new additional subunit:

This peripheral subunit, in which it includes another five subunits, such as one power supply, one local sensor, one local monitoring, one local central control, and one communication.

A power supply subunit, it provides the whole local 'dynamic balance training unit' power consumption. Such as: motor, computer, monitor, sensors, etc., within this unit.



Fig. 10

A local sensor subunit, it may includes several different aspects, such as: power consumption, contacting pressure varying to be getting from the body holding subunit and where the trainee standing, pulse rate of trainee during training period, oxygen consumption, or ID of the trainee, etc. The local sensor feed back sensing signals to local central control unit, for further processing use.

A local monitoring subunit, it is monitoring the instant situation by video during the training period, to provide further dynamic or static video analyzing on training; and it also provides the instant monitor in real time observing by trainee himself to correcting his faults during training period.

A local central control subunit, it provides the programmed or programmable functions to direct the three dimension driving subunit, and access the feed back signals from the sensors, with the further computing and processing then instantly to generate the suitable functions to train this trainee, records the trainee's over all training information, sending processed information to the international classification control center, etc.

A communication subunit, it provides the internet communication ability to interchange information

between the local dynamic balance unit and the international classification control center, for the purpose of providing the international managing and classification ability.

Fig. 10 is a perspective view of the 'dynamic balance training unit'. A simulation by CAD system, this model simulate a trainee under training condition by using this instrument, where we can observe that with the 3D driving bar and by a body holding secure firmly on the trunk portion of the trainee's body to generate the 3D movement universally.

We also can see from the Fig. 10 with the monitor and cameras the trainee can observing his practices during the training time. The safety belts it is length sensing activating, as trainee falls down, the length of safety belt will never let his hips touch the standing plane that will confirm safety.

Fig. 11 is another perspective view from front right, the body holding and 3D driving bar connected by a middle frame with four connectors, each with a pressure sensor inside, sensing pressure varying during system running and feed back to the local central control subunit; also under where the trainee standing area put in pressure sensors either, is able to sense the pressure variation, these two different kinds of pressure signals or information, to be received, and processed then saved in the local central control subunit and for ex-analysis use.

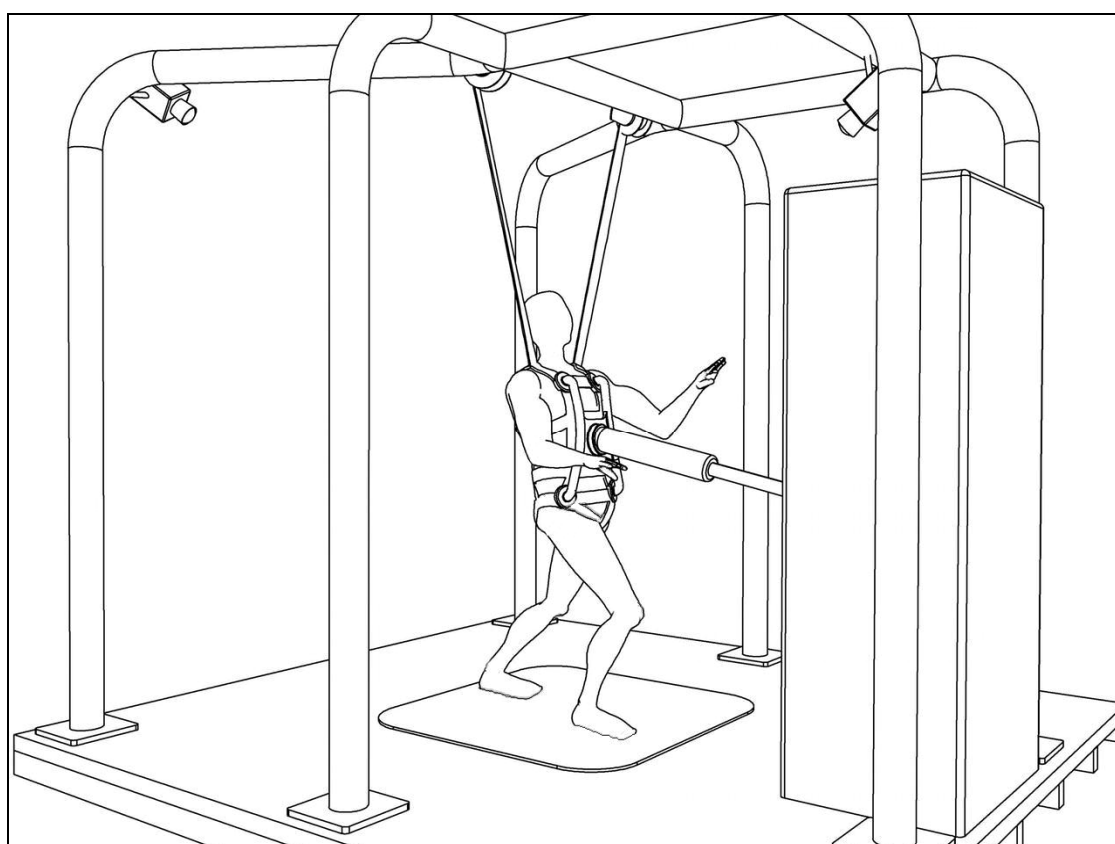


Fig. 11

### 13. The similarity, benefit and usage of 'the dynamic balance training instrument'

Uses 'the dynamic balance training unit' for the training purpose of the professional contestant of 'fighting techniques', it more approximately analogous, for example, a western cowboy in US rides a mechanical bull on the training for bull riding competition, or the cockpit to be used for the emulation on the pilot training.

Because 'the dynamic balance training unit' is used for 'fighting techniques' training, belongs to the 'human-mechanism' interaction mode, therefore for any each trainee will not directly against to the others; thus, the nature psychological resistance to be produced and caused by the 'human-human' direct resistance, to be fully eliminated naturally; therefore regarding 'dynamic balance training', the trainee passes through the brief explanation, may cause trainee is fully understand and can completely to prevent the training into the wrong psychological resistance mode. This advantage was formerly in the world all other kinds of

martial arts training method or equipment is unable to achieve.

Further, 'the dynamic balance training unit' is not only applicable for 'fighting techniques' training such narrow and small range. In regards to the comprehensive martial arts, for all items of the exercises or sports, so long as in which has any bodily contact, like boxing, Judo, wrestle, Tae Kwon Do, Japanese Sumo, fair charge in Soccer, block out in Basket Ball, tackle in American Football and so on. Alternatively, by equipment extending body contact, for example, Japanese Kendo, foil, epee, saber in western world etc., 'the dynamic balance training unit' is suitable for using as the fundamental training purpose at all; 'the dynamic balance training unit' may be used in the fields: security person, police, special forces army etc., on fundamental training of barehanded fighting techniques.

A trainee who accepts short-term dynamic balance training to continue for a year, with 3~4 hours practice per day, surely may cultivate correct nature response on dynamic balance, therefore his dynamic balance to be compared with, is far better than his opponent without accepted this training, then his fighting skill is more easy to display than his opponent. In the past it needs hard training for years but not necessarily can achieve this goal. Therefore one who accepted the full training through the process of 'the dynamic balance training unit', should with the ability by a person simultaneously resist several opponents who without 'dynamic balance training'.

Because 'the dynamic balance training unit' its philosophy foundation of elementary theory, is originally comes from martial arts theories of *TaiJiQuan* in China, namely 'Abandon the subjective of one's ego instead as a follower.' Almost each Chinese people they practice martial arts all knew a proverb: 'For decade long time training on *Taijiquan* practice without the ability to go out and to engage a real fight', this is a real description on normal masses phenomenon, and also it point out the true In-Fight boxer training is extremely difficult to accomplish. The reason is when practice nearly nobody is willing to achieve 'Abandon the subjective of one's ego instead as a follower.' Because person of the greatest majority, at real mutually practice, almost everyone is unable effectively to change the mindset of his own, or breaks through the psychological barrier of his ego; therefore the strength of real fighting ability of the trainee is unable to promote naturally.

However, if we use 'the dynamic balance training unit' to instead as a simulated enemy for the trainee, its result is completely different. First, what the trainee face to is the training instrument, comparing to face to his real opponent mutually, the necessarily and abiogenetically resistance mental state, will not occur entirely; so long as to make a brief illustration, then it can make trainee to rest on theories, making the certainly effective practice.

Next, if one wants in competition or on arena to defeat his opponent, at the usual training time, all contestant should make some excess training in right amount; for instance, the contestant of 60 kg class, may must with the opponent of 90 kg class or higher weight class, have to fight empirical training and real strength. But for the contestant of heavy weight, super heavy weight or infinite heavy weight, where he can look for his proper opponent to make the excess training? Need not to worry, by the method on training with 'the dynamic balance training unit', it can supply the superior opponent for training. This is an electrically operated training instrument, its power output, if by necessity it has the power as an elephant that will not be any problem on the engineering field completely.

Try to compare a civil airline pilot without G training with a fighter pilot accepted more than 6G training; it is obviously to realize the differences among them.

Suppose that, if a contestant can frequently face to the training opponent and completely respect to the theories of 'the science of fighting techniques'. During the training period, according to above discussion, only needs very short time within one year, then completes his spinal cord reaction training, namely this trainee now already is an In-Fight fighting expert and cultivate with the correct intuition reaction ability. Thus, if by one not accepted this dynamic balance training instrument does correctly spinal cord reaction training also does not make the excess training, then this participative contestant, engaging with this In-Fight fighting expert, with no doubt immediately have to be at the situation under defeated or restrained.

## 14. The scientific improvement and the technical development based on the fundamental research

In China anybody who practice martial arts knew that, *TaiJiQuan* indeed was dominates in the field of the philosophy above all other kinds of martial arts training in China, *TaiJiQuan* uses in 'fighting techniques', truly is in the theoretical and actual situation all matches to the science principles and theories, only formerly

because the science and technology was not developed, therefore no one has the ability that conduct and actions analysis and integration by science; mostly, in China's imperial civil service examination time, the study martial arts person, are many in particular wealthy, often does not like studies the literature, the study literature person, is immersed into the books pile whole day long, with obtain merit and fame as his purpose, also does not study the martial arts, therefore the literature and the martial arts separately into the different way, and can not merge together. Therefore the study martial arts person also can only realize in the aspects of philosophy or make some changes on the recruit style.

At the present, the science and technology is developed, the person who studies science and engineering, although by the scientific method, have the ability of analysis and integration, and usually not have the cultivated manners of the philosophy. In particular, one who's humanities accomplishment with personally repairs does not suffice, regarding the essence of martial art ('the science of fighting techniques') is unable to comprehension and control completely, therefore he does not have the ability to make scientific analysis and integration on 'fighting techniques'.

The science is to comprehend the origin and essence of all things within the universe, the technology is based on the comprehension of the origin and essence of all things, then with the innovating research and invention, creates the appliances and articles offering the benefit to the mankind.

For instance, if does not have Bernoulli's equation, also does not have the Venturi tube, the airspeed in atmosphere of an airplane to be unable to know. Bernoulli's equation is the science, Venturi tube is the technology; former is the theory, latter is the application.

At present, looks around the world on sports simulation training instrument for the contestant training field, all is limited in the visual domain, almost nobody reaches to the touching sense domain and in dynamic balance training field. Caused by above discussions, this kind of visual domain simulation training instrument can produce the minimum effect and is limited by theoretically of its own; and particularly in body mutually contacts sports item, it is almost without any substantive effect.

Therefore in the field of 'the science of fighting techniques', the world at present not yet has any person to propose like the author originates the basic theories and its correlation invention.

Einstein although can issue the mass energy exchange theory of relativity, really makes the atomic bomb, still needs the power that the nation gets involved. The theories proposed by the author although must not and also dare not to place on equal standing with the theories proposed by Einstein, but indeed in the field on individual of 'the science of fighting techniques', steps an unprecedented development stride.

## 15. International standardized classification of the fighting ability with the dynamic balance training & classification system

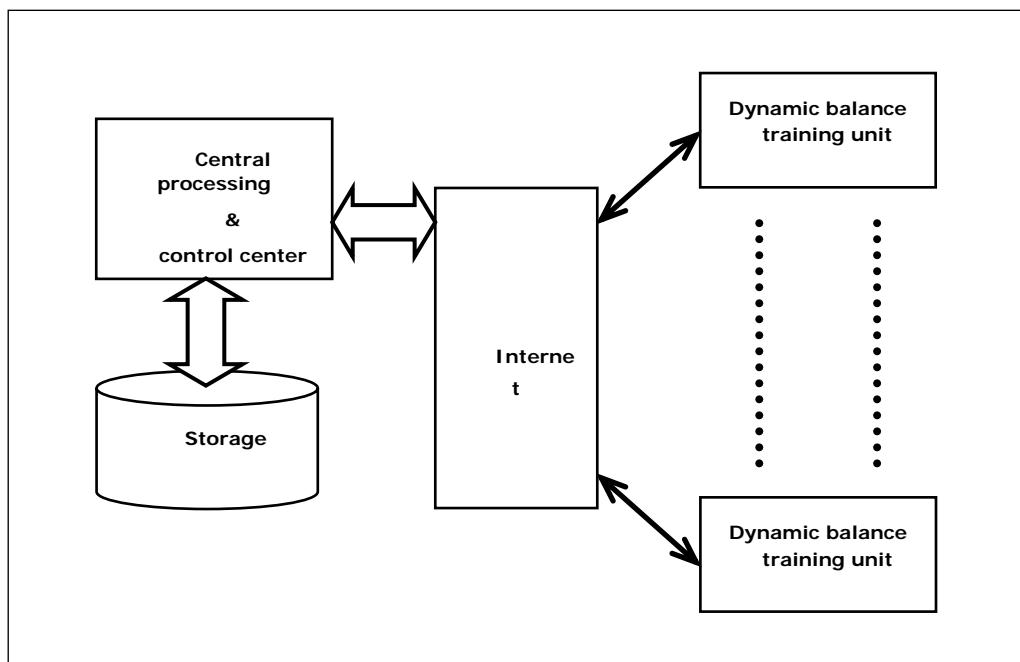


Fig. 12

In Fig. 12, Shown a schematic of the whole dynamic balance training & classification system, through the internet each dynamic balance training unit located and separated worldwide connect to the central processing and control center of the international organization of martial arts classification.

For each dynamic balance training unit, it with several sensors to feedback the conditions of trainee instantly to the local dynamic balance training unit by primary processing then pass to the control center, through the comparison of mass data stored in the storage of the control center, with the parameters such as trainee's ID, weight, instant power assumption, resisting force, pulse rate etc., easily can objectively classified the fighting ability of this trainee. Compared to the subjective classification about the martial arts ability of different kinds of martial arts in the world, it is with the public credibility more than others.

Also by this public credibility to classify the fighting ability, it is no doubt and obviously can through the international managing organization to standardize the classification on the field of the comprehensive fighting ability.

Thus, by discussion on above, 'the science of fighting techniques' now is measurable by means of the author proposed theories and applications. Measurability is a key to improve the science go further in the future.

## 16. '*TaiJiQuan* Article' by Wang, ZhongYueh of Ming Dynasty

'*TaiJiQuan* Article' (*TaiJiQuanLwen*) to the martial arts learning person, especially the *TaiJiQuan* learner in China, it merely likes the Bible to a Christian, if any one without the opportunity to understand the inner true essence of *TaiJiQuan*, then he is by no means to understand the truly essence of my paper, for the purpose of helping the foreigner who is able to understand *TaiJiQuan* with this reference, the author tries to translate the '*TaiJiQuan* Article' in English as below [1]:

*TaiJi* generated from *WuJi* (chaos; Primordial State), the source of *Yin* (negative) and *Yang* (positive); in movement it separates, in stillness it combines. It is without excess and deficiency, as following the bending and extending of opponent. Yield with soft against rigid as opponent's advantage, as dominance the opponent then stick. Rapid movement then responds with rapid, slow movement then replies with slow. Although it is with infinite variations, but the principle keeps only one thread. By long-term practice well-known the skill then gradually cognize Comprehending-Ability (*DongJing*), from *DongJing* then steps to the stage of holy clarification (*SenMing*). However without paying one's effort over long time, it will not be able to suddenly achieve a thorough understanding.

With empty inner thoughts and lift head up with vigor, let *Chi* sinks to inner center of underbelly (*DanTian*). Without leaning and inclining, alternately suddenly hiding and appearing. Feels left heavy then left is empty, feels right heavy then right is missing. Face upward then high, face downward then depth, advance extends longer, retreat confines shorter. A feather cannot be adding and a fly cannot land either on me that is why my opponents by no means to know me, but only me can know them all. Be an invincible hero who is without proper match achieved by this method entirely.

The fighting techniques with many other kinds, although with the different style, merely are nothing more than the stronger bullying the weaker, the slower yielding the faster, one with strength overcomes whom without strength, and fast hand prevails over the slow hand, all these are from inherent natural abilities, and bears no relationship to the ability that comes from studying with effort. Examining the expression that "One using a force of four ounces can shift a thousand pounds.", obviously this is not accomplished by means of strength, Observe the situation in which a very old man with the ability is able skillfully to defeat off the crowds of people. How can it achieved only by fast?

Stand have to like a balance scale, nimble rotation like cartwheel, when opponent is bias subside then follows, dual loads then stagnates. Whenever we see those who have practiced diligently for many years, yet are unable to utilize the counterbalance all are subjugated by his opponent, it so far caused by whom cannot comprehend the fault of dual loads. With expectation evades this fault, one must know *Yin* and *Yang*; stick is yield, yield is stick, *Yin* cannot separate with *Yang*, *Yang* cannot separate with *Yin*; the mutual collaboration of *Yin* and *Yang* is precisely what makes up *DongJing* (the Comprehending-Ability).

After getting with *DongJing*, diligently practicing will refine the skill greatly; by learning implicitly and mentally, and gradually you can achieve what you get as your wish. The true essence is '**Abandon the subjective of one's ego instead as a follower.**' (*SerJiTzonZen*), the mass majority mistakenly leave off the near and in pursuit of what is far away. So-called this trivial fallacy (trivial error) will cause a completely wrong direction (a thousand miles divergence) of practicing the martial arts.

All learners must therefore be carefully discriminating the details herein. Thereupon makes this article.

## 17. The negative influences, it caused by ‘the dynamic balance training instrument’.

As described in *TaiJiQuan* Article, *Yang* cannot separate with *Yin*, all things as coin has both sides coincidentally; this invention of ‘dynamic balance training instrument’ also is not with exception. Negative influences it brings then lies in:

While this instrument already popularized, the story of the weakly one strikes the stronger will not easy to happen again, namely two opponents if all of both have received the fully training by using the ‘dynamic balance training instrument’, the well build and with physical strength occupies superiority winning rate to be still higher.

Next formerly the In-Fight expert, almost they were for many years self-training superior of disposition, or could break through the psychological barrier to be able to achieve. However, from now on anyone without self-training at all for his disposition, also can pass through a short-term training by using this ‘dynamic balance training instrument’ becomes an In-Fight expert; if he does something criminal, or pinches with fighting technique to bully people, also will create heavily disaster. It should be bring into careful consideration and plan ahead of time to prevent and to regular. That is why the author will bring the international management organization concept into consideration as discussed earlier.

Come again, cause of without accepting the dynamic balance training will not have any opportunity to win in bodily contact sports field or arena, thus the contestants will be forced to accept the dynamic balance training and without any exception. It also brings un-equal situation absolutely between the rich and the poor. The poor one economically without the ability to accept ‘dynamic balance training’ will get the result that he will never have the opportunity to stand still or win in the competition what he participate in.

## 18. Conclusion

Synthesize above deductions, and make a summary here, this invention ‘the dynamic balance training system’ shocks to ‘the science of fighting techniques’(the domain of individual martial arts), its might reality is not inferior shocking to ‘the atomic bomb or the nuclear bomb’ regarding the international war(the domain of group martial arts).

In 2008, because China sponsors the Olympic sports games in Beijing, the author already ahead of time informs this invention related theories and training implementation time schedule to the China government. ‘2006 THE NATIONAL CONFERENCE OF SCHOLARSHIP & TECHNIQUES ON DEVICES & INSTRUMENTS OF SPORTS AND SYSTEM SIMULATION’ which convened in Hangzhou at the Zhejiang University by the branch of devices & instruments of sports under China sports science society, and the professional committee of sports system simulation of China system simulation society; and ‘2006 UK-CHINA SPORTS ENGINEERING WORKSHOP’ which convened in Beijing, at the China institute of sports science by the cultural & educational department of British embassy, the branch of devices & instruments of sports under China sports science society, and the professional committee of sports system simulation of China system simulation society; except these two papers(Chinese version) to be able accepted and published; the author with lot efforts tried to inform the leader of China, but the decision maker of China government might not with the opportunity to know the information be sent from and by the author; thus could not value this invention which is able to bring many extra medals for China in the Olympic 2008, also might not have the ability of foresightedness cognition this invention can make such enormous industrial system and huge commercial benefit to China.

At here, the author illustrates detail of the theories by English, and first time open this opportunity to all other nations in the world and any international enterprise that value this invention; at 2012 the Olympic sports games is sponsored by the British government in London, any country wants their contestants get an excellent credit, through the illustrations that proposed by the author on above, it is definitely that have to use ‘the dynamic balance training instrument’ for the foundation of their contestant’s ‘dynamic balance training’ in the field of all kinds of bodily contacting sports. If the conditions of the cooperation are appropriate, or if the country have the initiative to obtain this opportunity for cooperating with capital invested, the author will establish the headquarter of this business enterprise and a R&D institute for further developing this industry continuously in that country. Certainly, the government of any nation, so long as providing the round-trip flight ticket and full traveling schedule essential accommodation expense, the author

can be invited and to visit that country, using the powerpoints makes the briefing of the integrity about the system of the business enterprise and the term of cooperation of whole invention and future development etc.

## **19.References:**

- [1] *Wang, ZhongYueh* (China, *Ming* Dynasty) '*TaiJiQuan* Article'