

# HOW TAI CHI WORKS TO PREVENT FALLS

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## **DISCUSSION PAPER NUMBER ONE *HOW TAI CHI WORKS TO PREVENT FALLS***

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### **BACKGROUND**

As our population begins to age and we live longer and longer we are beginning to recognise a growing cost from falls. By falls we are not talking about falling off buildings or over cliffs but loss of balance situations which cause us to move quickly from a vertical to horizontal position during simple acts like walking around or climbing stairs. In our earlier years such falls generally means a bruise or two and a few minute's pain, if we are very unlucky we might break a bone or suffer more serious damage. In our later years such falls are fraught with danger often resulting in hip replacements and extended periods of incapacity. Such falls can rob us of our independence.



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Putting aside for one moment the cost in pain and suffering and loss of quality of life the cost of falls is placing a tremendous burden on our medical infrastructure. This cost is not only huge but also rising at an alarming rate. Across the world studies are taking place to determine what can be done to reduce the incidence and impact from falls. The federal Government of Australia has for instance allocated over \$6,000,000 dollars for research into the prevention of falls.

For some time the focus in falls prevention has been on the elimination or containment of situations in which falls are likely to occur. Non-slip floors and provision of proper hand holds in bathrooms. Placement of handrails, reduction of slopes and increases in tread sizes of stairs would be examples of efforts in these areas. The problem in this approach is first that the cost of securing all such areas is enormous and that second people persist in falling down in areas where such safeguards are not present. It is obviously most important that as well as eliminating fall hazards as much as possible is done to make the individual as "fall-proof" as possible. The question then is what can we do to an individual that will reduce the likelihood of falls?

Many studies have taken place in this area but so far only one form of exercise has been shown to have a significant and permanent impact in reducing falls. The name of this exercise is Tai Chi. The scientific study that was performed was carried out in the USA by Professor Xu and showed that a thirteen-week course in Tai Chi could reduce falls by 40%. Looking at this another way means that the practice of Tai Chi could in itself reduce the cost of falls to our society by almost half. A tremendous contribution.

But what is Tai Chi? Many people have learned Tai Chi over the past decade and will be aware that there are both a variety of forms Yang Style, Chen Style, Sun Style, Ho Style, Wu Style etc. They will also be aware that Tai Chi can be taught with a variety of focuses including everything from martial arts to gentle relaxercise. If we want to gain the maximum reduction in falls which style of Tai Chi should we choose and what focus should we have when learning Tai Chi?

We know that the style used in Professor Xu's work was Yang style and we know that the form was taught on the basis of Tai Chi as being a health and relaxation exercise so this is a good start. Personally, I believe that the style of Tai Chi is unlikely to make much difference as long as the style complies with the precepts outlined in the "Tai Chi Ching Classics". *(These were the original writings on Tai Chi that established the principles a form must contain) to be properly called as Tai Chi.*

It is therefore useful to look at these principles and see how they might be associated with prevention of falls.



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EXAMINATION OF HOW TAI CHI "PRINCIPLES" ACT TO REDUCE THE RISK OF FALLS.

## *Principle One – Relaxation*

In any true Tai Chi you must always be relaxed. This brings many benefits but from a falls point of view it is particularly important. When you are mentally tense you hold tension in muscles and tissues. This tension (excessive postural hypertension) has a number of implications:

- First it causes changes in the body that raises the centre of gravity. The higher your centre of gravity the more difficult it is to maintain balance. You do not have to believe me on this just stand on your toes with your hands over your head and see how much harder it is to balance. Excessive postural tension creates a similar effect.
- Second, these muscular tensions act to reduce the ability of the muscles to make the hundreds of small adjustments necessary to keep our body posture balanced. To remain upright and walk the body must keep over 120 muscles working in a balanced and co-ordinated form.

One of the most important techniques for achieving relaxation is the diaphragmatic breathing used in Tai Chi (this means use of the muscular sheet lying between the chest and abdominal cavities to initiate the breathing action). You should always check that your Tai Chi course includes instruction in this technique. Diaphragmatic breathing will also act to lower the centre of gravity. The more you tend to use diaphragmatic breathing and stay relaxed the less likely you will be to fall.

## *Principle Two – Posture*

The centre of gravity needs to be maintained not only from a vertical but also a horizontal viewpoint. That is from a horizontal viewpoint the further the centre of gravity is from the centre point between the feet the harder the muscles must work to maintain the balance. This is also easily demonstrated by keeping the body straight and leaning forward or backward. You will soon come to a position where you cannot maintain your balance.

You should look for a Tai Chi form that emphasises the straight back with the head in the "riding the wind" position and the tailbone tucked under. The "riding the wind position" is often called "the suspended headtop" and is where you feel as though the head is being lifted up through the crown of the head (Bai Huai point if you want to be technical).



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## *Principle Three – "Silk-like movement"*

Tai Chi teaches a form of movement that avoids jerky, angular changes in direction and speed. This requires the avoidance of any situation in which the joint is "locked" or at full extension. This is important because such locking reduces the available ranges of movement reducing the opportunities for correcting balance. One is also taught not to come to a jerky stop at the end of an extension of leg or arm movement. Such jerky stops are situations where the momentum of a limb may act to throw the body off balance.

In a sense what is being taught here is one aspect of kinaesthetic awareness. That is the development of body awareness. Obviously when you are aware of how your body is moving and what its position in space is you are more likely to become aware of any loss of balance before it becomes extreme enough to be a threat.

One practical example of the importance of not having the limbs extended is in walking. If you stand with the knees in the lock position and extend one foot you will find that it does not reach the ground in front. Only when you bend the supporting leg does the other leg reach the ground. So how do those people who habitually walk with their knees almost in the lock position walk? Basically they fall forward onto the front foot! Part from damage to joints this is a very high fall risk manoeuvre. In Tai Chi you should be taught to "Walk like a cat" that is the foot comes forward first and the weight is only transferred when the foot is safely on the ground.

## *Principle Four – Unity of movement*

The Tai Chi classics teach that all movement is rooted in the feet, powered by the legs, directed by the waist and expressed through the hands. As you learn this form of movement you learn techniques that avoid movements of the limbs that pull the torso of the body of balance. It is another aspect of kinaesthetic awareness.

## *Principle Five – Base of Balance*

Tai Chi teaches what is called the square stance and square stepping techniques. What this does is too teach movements that expand the base of balance that we use. If you place your feet side by side and wiggle your hips around you will find it much harder to keep your balance than if you stand with your feet shoulder distance apart. Similarly if you step with one foot directly in front of the other foot and wiggle your hips around you will find it much harder to balance than if you have your lead foot to forward but shoulder distance to the side. This may seem obvious but you would be surprised how many people habitually walk by placing their feet almost directly in front of the other thus exposing themselves to a high-risk fall posture.



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## *Other aspects of Tai Chi training that may impact to reduce falls*

While Tai Chi is often regarded as a gentle exercise, and should be pleasant and pain free to perform, the various biomechanical techniques that it uses does build muscular strength and physical stamina. These benefits are primarily due to the slowness of the movement and the fact that it is performed with bent knees (this increases the muscular and cardiovascular loading).

Tai Chi is a holistic exercise that works on more than biomechanics. Positive thinking is encouraged and developed. If you do not think that your state of mind has any influence on your propensity to fall consider walking across to planks. Both are 40 centimetres wide and 5 metres long. Both are completely rigid. The only difference is that one is lying on the floor and the other is connects to buildings 40 stories high. Which one do you think you are going to fall off? The one that you have the most negative thoughts about!

Tai Chi also works on balancing the Chi or vital energy of the body in Chinese terms the more unbalanced this energy the more likely you are to be unbalanced from an mental, emotional and physical viewpoint and the more likely you will be to have a "fall" in each of these areas.

## *Could other exercises achieve what Tai Chi does?*

To date despite considerable efforts there is no scientific evidence that other exercises can achieve the fall benefits that can be achieved by Tai Chi. Attempts are being made to show that sets of exercises in which individual exercises may work on such things as posture, muscular strength or relaxation can when added together achieve the same effect as Tai Chi but so far without success. I tend to suspect that it is the fact that so much is going on within each movement of Tai Chi that contributes to the development of fall prevention skills.

Also, surely the point is that we have a scientifically proven way of reducing falls so why not use it? The case is strengthened when we realise that Tai Chi is not just exercise that prevents falls. It has also been shown to be beneficial to the immune system, arthritis, asthma, osteoporosis, stress management, cardiovascular development and so on. Tai Chi offers an exercise system that is fun, that is well within the range of most of the population and that is relatively "risk free" to learn.

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